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HOLLAND AND THE DUTCH.

By Captain N. L. WALFORD, R.A.

THIS paper must begin with a protest against the names which head it, since the former implies a confusion between a part and the whole, while the latter is entirely and altogether incorrect.

The country which it is proposed to consider in the following article is called by its inhabitants "Netherland," or "The Netherlands," and contains eleven provinces, of which North and South Holland, though perhaps the richest and most populous, are by no means the largest, and, except by possession of the political and commercial capitals, have no claim to be considered in any way superior to the remaining nine.

The second error is, however, by far the greater, since, founded on misapprehension, it is not unlikely to lead to some confusion, for "Dutch" which may be presumed to be a British corruption of "Duitsch," is the name applied by the Netherlands to those whom we call Germans, from whom the people they hold themselves to be entirely distinct. It is true that there are many points of similarity between the two languages, yet there are also essential differences, that no one who has heard both spoken could fail to distinguish between them, even though on looking at them, as written, he must acknowledge that they are obviously of one family.

If there be a quality which more than any other has characterized the Dutch, it is their sturdy and almost contemptuous independence in thought and action: small in number and confined to a narrow territory, this remarkable people have, under various vicissitudes through several centuries, preserved a distinct individuality; and if it is admitted that a national character, a national language, and national customs go far to create a people, we must acknowledge that the Dutch are a nation and should be relieved from the name with which, in our ignorance, we have dubbed them.

The Dutch have in turn won their land from the sea, and freed it from alien masters; and though their country has been held temporarily by Spain, Germany, and France, have never shared the nationality of their rulers, never adopted their language, and have never failed to seize the earliest possible opportunity to rise against the foreigners, and to reassume an independent existence.

One point, though perhaps a small one, well marks the particular in-

duality of the nation. In other languages, nearly all scientific including even those in familiar use, are constructed with the help of or Greek, changed according to the genius of each people into some *bastard patois*; but the Dutch, while second to none in their intell culture, reject the foreign name, and, constructing its equivalent in thei language, make the word their own as well as the thing.

Enough has probably been said to show that we have no more reas call this people "Dutch," and their country "Holland," than they have should they call us "Saxons," and describe England as "Kent."

It is proposed to divide this paper under the following heads :—

- I. The Military Geography of Holland.
- II. The Military History of Holland.
- III. The Army, Finances, &c., of Holland.
- IV. The Politico-Military Position of Holland.
- V. The General Plan of the existing and proposed Defences of Ho
- VI. The details of the various Defences and Inundations.

I.—THE MILITARY GEOGRAPHY OF HOLLAND.

This country may, for the purposes of strategy, be compared to a tri one side of which is formed by the sea, while the others follow the li her southern and eastern frontiers. She is liable to invasion on any or these sides, since her boundaries have no natural defences, unless we r the sea as such, while the nature of the country itself, proverbially fla low, forbids the existence of any ground such as would afford a posit the ordinary sense of the word.

But formed by the water, conquered from the water, it is in her wate that Holland finds at once her means of communication in peace, a defence in war. Napoleon, in 1810, justified the absorption of Hollan the French Empire by the fact that this land was formed by the al deposits of French rivers ; and it is, in truth, the delta of the Rhine and Meuse or Maas.

Since it will be necessary in the course of this paper constantly to re these rivers and their effluents, it will be well to commence the subject examination of their course, more especially as we shall find that a which divides, or which unites with another, almost invariably chang name.

The Rhine, shortly after crossing the frontier of Holland, divides into

A. The Pannerden Canal.

I. The Waal.

A. The Pannerden Canal, at Arnhem, divides into—

B. The Gelder Ijsel, which runs north by Zutphen and Zwolle in Zuider Zee at Kampen.

C. The Neder-Rhine ; this, at Wijk-bij-Duurstede, divides into the

D. Kromme (or winding) Rhine.

E. The Lek.

D. At Utrecht, the Kromme Rhine divides into—

F. The Old Rhine, which flows into the North Sea at Katwijk, sending the Amstel to the north into the Zuider Zee.

G. The Vecht, which runs into the Zuider Zee at Muiden.

E. The Lek, parting with the Holland Ijsel, itself runs into the Merwede or North Maas.

I. The Waal, after receiving the Maas, or Meuse, at Woudrich Worcum, is called the Merwede. Near Dordrecht the Me divides into—

Principal Mouths of the Rhine and Maas.

- II. The North Merwede or North Maas.
 III. The Old Maas, which runs into the North Sea.
 IV. The South or New Merwede, which runs through the Holland
 Diep, and the Haringvliet into the North Sea.
 II. The North Merwede, or Maas, after receiving (E.) the Lek, is cal
 the New Maas, and as such receives the Holland Ijsel, after whi
 it runs into the North Sea.

The smaller waters, such as the Vaartsche (or canalized) Rhine, the Lin and a little river called also the Old Maas, have been omitted in the pl but will be found in the map.

Putting aside for the moment the question of the defence of the coast since that portion of the frontier resembles in great degree the sea-line of other countries, let us consider the defensive character of the southern and eastern sides of the triangle.

1. *The Southern Line of Defence.*

This is formed first by the course of the Maas, which will, when the bread of the river is made constant by an intended system of dykes, have between Crèvecoeur and Loevenstein a width of from 185 to 550 yards, according to the river may be low or in flood. It is crossed at Crèvecoeur by a railway bridge 780 yards in length, and sufficiently wide for a double line; at that point there is also a bridge of boats. There are also many flying bridges and ferries.

The second line is formed by the Waal and the Merwede. The form varies in width from 270 to 1,070 yards, but in time of flood is in places 3,000 yards wide. There is a railway bridge at Bommel, broad enough for a double line, and 950 yards in length, and there are further, at many points, flying bridges and ferries. The Merwede has a width of from 550 to 1,300 yards and has no bridges, though ferries are numerous along its course.

It may be well, before passing to the third line, to say that the railw

bridge over the Hollandsch Diep near Moerdijk is for a single line, and has a length of 2,568 yards, including the piers on each bank: the actual bridge (iron lattice) is in two parts, a swing bridge of 70 yards, and a permanent bridge of 1,600 yards in length.

The third line is formed by the Lek, a river of from 180 to 500 yard width. It is crossed at Culeburg by a railway bridge, 720 yards in length, of which the pier in the river is provided with a chamber for a mine. There is a boat-bridge at Vreeswijk, and numerous flying bridges and ferries along the river.

The general character of the country is the same throughout this part of Holland. It consists of highly cultivated land, of which a great part lies lower than the canals and rivers, the latter of which are confined by strong dykes, while the former, in many cases, run parallel to the roads, on the dykes which intervene between the "polders."

And here it may be well to describe what is meant by this word "polder," since almost the whole of Western Holland is made up of land so saved. "polder" is the bed of a marsh or lake, which has been, and is daily, drained of water, and is thus made available for cultivation. The process is as follows:—A dyke, on which is a canal, is first made round the spot or district selected, and into this canal the water is pumped by wind-mills or steam engines, until at length the surface is comparatively dry; ditches are made in the polder, and from these again the water is pumped into the canal until the land is suited for the purposes of agriculture. In some cases the original marsh lies so low that it is not possible to raise the water at once to such a height as will allow it to run off. In this event, it is pumped from one to another of various canals of gradually increasing elevation, until the desired height is attained.

The general appearance of a polder is that of a large field, containing frequently 300 or 400 acres, surrounded by a green bank, in some cases 30 feet in height, and intersected by numberless ditches, from 3 to 10 feet wide, which cross each other usually at right angles. It would thus be exceedingly difficult for troops to move over such a district, even were it not inundated, while the dykes round the polders entirely prevent any view being obtained of the surrounding country. The roads run, as before mentioned, along the tops of the enclosing dykes, and it is almost impossible for any one not a native of the country, to cross a polder, or in any way to make a cut. The roads are of various kinds: (a) The "straatweg," which is paved either with stone or with bricks (or rather tiles) set on edge; this is an excellent road when in repair, but exceedingly trying to the feet, and is generally about 12 to 15 feet in width. (b) Macadamized roads, of which there are few, since in most parts of the country there is no stone. (c) "Grintweg" or gravel roads, which are fairly good in fine weather, but would soon be destroyed by the passage of artillery. (d) "Zandwegen" and "Kleiwegen," which are merely tracks in sand or clay; these last are, as a rule, the only available means between the dykes. Roads are, however, comparatively little used in Holland, the greater part of the passenger traffic being carried on horse or tramway, while goods are principally transported by the canals.

Enough has probably been said to show that the defence of this part of Holland is easy, owing to the impassable nature of the country, and the fact that the roads, by which alone an army can advance, running as they do along the tops of the dykes, are entirely commanded by any works which may be posted on the latter, and are, especially should the intervening country be inundated, defiles in the strictest sense of the term.

¹ It has been found by experience that water can be most economically raised by pumping it to a height of only 1 metre for each engine. There is a polder near Alkmaar, where the water is raised into four canals in succession before it runs

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2. *The Eastern Lines of Defence.*

Of these the first is formed by the Gelder Ijsel from Kampen to Arnhem. This river varies in width from 70 to 320 yards, but when in flood, its breadth of from 1,100 to 2,200 yards. Its depth varies considerably, but in dry seasons it is fordable at at least three points, namely, at Dieren, between Deventer and Olst, and at a point below the latter place. It is crossed by three railway bridges:—

- (a) At Westervoort (near Arnhem), by a bridge of 300 yards in length carrying two lines of rail.
- (b) At Zutphen, a lattice-bridge for a single line of 400 yards in length between the embankments. This bridge has a carriage and a railway way in addition to the railway. One of the piers contains a chamber for a mine.
- (c) Near Zwolle, a bridge over 500 yards in length, carrying a single line but wide enough for a second. Under one of the piers of the bridge also is a chamber for a mine.

There are boat-bridges at Westervoort, Doesburg, and Deventer, while at Kampen there is a permanent iron bridge for carriages and foot passengers. There are numerous ferries.

The ground to the east side of the Ijsel is lower than that on the west, and the river is dyked along its right bank except about Deventer, but on the left bank such protection is needed only in parts.

The second line is formed by the river Eem and the Grift, which, near each other, flow, the former northwards into the Zuider Zee, the latter to the south into the Neder-Rhine: they are connected by a brook which bears the name of the Lunter.

The Eem has a width of about 60 yards, and is crossed by a railway bridge near Amersfoort.

The breadth of the Grift is 17 or 18 yards only.

The country between the first and second lines is, especially in the southern portion, high, dry, and sandy, and along the line of rail from Utrecht to Arnhem very much resembles the ground about Aldershot, being covered with heather and pine woods.

The roads are for the most part bad, and there is but little cultivation.

The third line is formed by the Kromme Rhine, the Vaartsche Rhine, and the Vecht, and this has been for three centuries the main line of the Dutch defence.

The Kromme Rhine extends from Wijk-bij-Duurstede to Utrecht, 12 miles, and is shut in along its whole length by dykes. Its breadth is 15 yards, and it is supplied with sluices for the purpose of military operations. It is crossed by a great number of bridges.

The Vaartsche (or canalized) Rhine is a portion of the canal which flows from Amsterdam by Weesp and Utrecht to Vreeswijk. It is about 5 miles in length, and has a breadth of about 30 yards.

Below Utrecht there is a bridge behind Fort Jutfaas.

The Vecht runs from Utrecht to Muiden, about 16 miles, and at the latter point enters the Zuider Zee. It has a width of 20 yards as a minimum and is crossed by a great number of bridges. At Nieuwersluis there is a dam and sluice for military inundations.

The country to the west of the second line, which at first resembles that to the east of it, changes its character on approaching the third line, and becomes so low and wet that it is little more than a collection of polders, of the character as those of which mention has already been made, the roads are before, running along dykes, while the intervening ground may be inundated.

It will be evident from even the cursory description which can be given an article such as the present, that the eastern lines of defence are far weaker than the southern, since all the rivers in the former are small, and the intervening ground offers no such facilities for defence as we find in the latter. The third line only can water be used to any great extent to assist the defence and even in this the higher ground about Utrecht raises that point above inundation level, and thus weakens the very centre of the line.

In the case of an invasion from the sea, the enemy, after landing, would probably endeavour to force his way along one or more of the canals which lead into the heart of the country, and we shall find that the coastal defences are so placed as to guard all or nearly all of these means of access.

From whatever point invasion may come, the centre of the Dutch system of defence is at the commercial capital, Amsterdam, which it is intended to hold as a *rédut*, or last retreat for the army; but since it is proposed to examine these defences in detail, it may be sufficient for the present to mention that the country round Amsterdam lies lower, and is more easily inundated (and therefore defended) than any other part of the kingdom.

II.—THE MILITARY HISTORY OF HOLLAND.

Having, in as few words as possible, endeavoured to give a general idea of the geographical character of this country, it may be interesting to describe in what manner the several invasions of the Netherlands have succeeded or failed.

Holland has been invaded: by Spain in 1605, 1606, and 1629; by France in 1672, 1793, and 1794; and by Prussia in 1787. We may omit the effort of England on the Helder in 1799, and on the island of Walcheren in 1809, need give but a few words to the collapse of the French rule in 1813 before the advance of the Russians and Prussians, which took place after the battle of Leipsic.

1. *The Spanish Invasions.*

In 1543, the Emperor Charles V, by right of his mother, became possessor of the whole of the Netherlands, and from him they passed, under his son Philip II, King of Spain and the Indies, his son.

This monarch, whose principle in life appears to have been to secure the safety of his own soul by the destruction of the bodies of millions of subjects, pressed on by intolerant zeal, endeavoured to force upon Protestant Holland the ritual and the Inquisition of Rome. Having failed to convince he determined to coerce the Dutch, but the latter, after meeting eloquence with eloquence and logic with argument, set sword against sword and violence against fire, and under William the Silent, Prince of Orange, made stern resistance against all weapons, spiritual and temporal. This Prince having been assassinated in 1584, his place was taken by his son, Maurice of Nassau.

(a) In 1605, Spain, irritated at the loss of prestige consequent upon continued resistance of the small republic, sent an army under Spinola against the Dutch, with orders to subjugate the entire country. Spinola, one of the best Generals of his time, aware of the great natural strength of the southern front of defence, resolved to turn it and attack the eastern front.

For this purpose he divided his army into two parts, with one of which he occupied Flanders, with the view of holding Maurice of Nassau, while the other passed the Maas between Grave and Venlo, the Rhine at Emmen and overran Gelderland and Overijssel. But Maurice, recognizing the decisive point of the Spanish strategy, broke away from his position attacking the Spaniards, drove them across the Rhine.

(b) *Invasion of 1606.*—In this year Spinola invaded Holland with two armies, of which that which he himself commanded was to cross the C

Ijsel, and to move through the Veluwe; while the second, under the Comte de Bucquoy, should cross the Waal above Nijmegen, and traversing the Betuwe, join him under the walls of Utrecht. Continued rains, which ruined the roads and made the country impassable, so delayed the march of Spinola that Maurice was able to arrive first at the Ijsel, and to organize the defence of that river, and the former was compelled to limit his efforts to the observation of the enemy; while de Bucquoy failed altogether in his endeavour to cross the Waal.

Maurice, in the meantime, lined the banks of the Ijsel and the Waal with a chain of redoubts, and placed armed boats upon each of these rivers. He thus succeeded in repulsing every attack of the Spaniards, who at length abandoned their scheme of invasion, and concluded a truce with the States.

(c) *Invasion of 1629.*—In this year Holland was attacked by a combined army of Spaniards and of troops of the German Empire. The Dutch Army occupied in great part in the defence of Hertogenbosch, left their eastern lines open to the invaders, who forced the Ijsel, overran the Veluwe, and having taken Amersfoort, were first stopped at Naarden on the left flank of the third defensive line. They were here checked by the fortification and inundations, which occupied almost the same position as the existing water-line, and were eventually, owing partly to events in Germany, partly to the want of supplies, forced to evacuate the country in haste.

The war with Spain, which began with the battle of Heiligerlee in 1568, found its end at the Peace of Westphalia, in 1647, when the Independence of Holland was fully conceded.

2. *The Invasion of 1672.*

France and England having declared war with Holland, Louis XIV. personally took command of an army of 120,000 men, and masking Maastricht passed the Maas at Maaseyck; marching northward he proposed to join the Bishops of Munster and Cologne, who held the right bank of the Ijsel. But a remarkable drought had rendered the Neder-Rhine fordable, and, changing his plans, Louis forced the passage of this river, and thus turned the line of defence of the Ijsel. All the strong places of Gelderland fell at once, and the army of the States retired on Amsterdam.

The country round the capital was inundated, and every approach being defended by works, while armed boats and floating batteries swarmed on the canals, Louis abandoned the attack as impossible, and, being influenced by the news of further complications with Germany, fell back from his position and retired into France.

3. *The Invasion of 1787.*

William V, the then Stadhouder,¹ married, in 1766, the niece of Frederick the Great of Prussia, and a quarrel having arisen between the people of Holland and their ruler, the latter was driven from Amsterdam. The Princess, while travelling without an escort to the Hague, was insulted by an Officer of the States Army, who, it is said, forced his way into her chamber with a drawn sword. Irritated at this affront, the King of Prussia ordered the advance of 26,000 men, under the Duke of Brunswick, into the disaffected provinces.

The Stadhouder had but 4,000 or 5,000 men, and Gelderland alone remained faithful to him, but this fidelity was of great service to the Prussians, since it carried with it the possession by William of the passages of the Gel and Ijsel, the first line of defence. The second line also, that of the Grebbe, could not be defended by the States, owing to the fact that the inhabitants of Amersfoort favoured the House of Orange.

¹ This is at least Dutch, while "Stadtholder" is not even English.

² The line formed along the Eem and the Grift is called the Grebbe line.

There remained yet the third line, from the Zuider Zee, by Utrecht, Gorinchem or Gorcum: this was held by the national army of 20,000 men, assisted by about 20,000 militia, the mode of occupation selected being of placing garrisons in the various works which covered the approach between the inundations, reserving about 10,000 men to defend the less exposed ground about Utrecht.

Reconnaissances especially directed on Naarden and Utrecht deceived Dutch leader, Count Salm, who expected a regular siege of one or both of these places, while the Prussian Army, which crossed the frontier on the 1st of September, with the intention of breaking through the line at Vreeswijk where the Vaartsche Rhine joins the Lek, attained its object, on the aid of its left wing at Gorcum, by the surrender of that fortress after a mere semblance of resistance.

The column which moved on Vreeswijk was unopposed, and, Uiteren and Nieuwersluis having been carried by a most gallant *coup de main*, Utrecht surrendered on the 17th, and Naarden on the 27th, by which date the whole of the line was in the hands of the Prussians.

There remained still Amsterdam, surrounded by a girdle of inundation but held by only six regular battalions, who were, however, assisted by numerous militia.

An armistice of four days, demanded by the Dutch, was employed by the Prussians in collecting boats on the Haarlem Lake (now drained), and at daybreak on the 1st of October, the latter, passing the lake, landed one of their troops at Halfweg, and another in rear of Amstelveen, where the first flank rested on the lake. After a sharp but short fight, both points were carried, and on the 9th of October the city surrendered at discretion. The campaign thus lasted only twenty-eight days, and their success was obtained by the Prussians with very inconsiderable loss.

4. The Invasion of 1793.

Shortly after the execution of Louis XVI, the National Convention in France, anticipating the action of those Powers, declared war upon England, Spain, and Holland, and two French Armies, one of 20,000 men, under Dumouriez, and the other of about the same strength under Miranda, invaded the latter country.

Miranda's share in this campaign may be stated in few words, for, having laid siege to Maastricht on the 20th February, he was driven thence by Imperialists under the Archduke Charles, and was during the first week of March forced back into Belgium.

Dumouriez, advancing from Antwerp, captured Breda on the 17th of February, Geertruidenberg shortly after, and next undertook the siege of Willemstad. He proposed, after the latter fortress should have surrendered, to cross the Biesbosch, and to march directly on Amsterdam; but the siege of Willemstad was raised owing to the gallant action of Lieutenant Weverton, who was in command of three British gunboats, while the Dutch evacuated their troops in front of the French, and, having been joined by British force under the Duke of York, were in sufficient strength to resist the passage.

The number of boats also which could be made available was insufficient for the transit, and Dumouriez himself having been hastily recalled to the disastres of Miranda, the French abandoned the attempt at Holland and fell back on Antwerp.

5. The Invasion of 1794.

The Allied Army having, after the Battle of Fleurus, retired to the Dyk, was pressed back by the French under Pichegru, who determined to repeat the attempt of the preceding year.

The French had in the Netherlands a force of about 84,000 men; the British numbered about 35,000, and the Dutch about 15,000. The Austrians, fearing for Coblenz and Cologne, retired by way of Maastricht across the Maas, and were followed by a French army under Jourdain. This defection compelled the retreat of the Duke of York, who, on the 22nd of July, had retired on Rozendaal, between Breda and Bergen-op-zoom.

Pichegru, by order of the Convention, delayed his march until the four French fortresses, Quesnoy, Landrecy, Condé, and Valenciennes, had been recaptured from the Allies, but he advanced on the 4th September, and carried the position of Boxtel¹ on the 14th, after which event the Anglo-Dutch Army retired behind the Maas.

Hertogenbosch surrendered on the 10th of October, and Fort Crèvecœur having previously fallen, the Duke of York fell back behind the Waal, with his headquarters at Nijmegen, while detachments of the British troops were posted along the river as far as Gorcum. Taking advantage of the length and consequent weakness of this line, Pichegru attacked the centre, and having obtained some slight success, drove back the Duke on Arnhem.

The Dutch troops now drew back to Grebbe on the Neder-Rhine, Ven and Nijmegen were captured early in November, and in the beginning of December the Duke of York returned to England.

Pichegru having been compelled by ill-health to relinquish the command to Moreau, the latter attacked Bommel, but was repulsed, upon which he sent his troops into winter quarters.

On the return of Pichegru towards the end of December, he, realizing the great assistance would be given by the intense frost of that winter to the efforts of his troops to cross the inundations, determined to continue the campaign. He renewed the attempt on Bommel, forced the passage of the Waal, and drove the Dutch Army to Gorcum. The British, who seem, at the departure of their General, to have become more active, attacked the French in their new position, and forced them to recross the Waal; Pichegru, on the 2nd of January, 1795, again passed that river at Tuil, and having on the 4th repulsed an attack, succeeded in maintaining his position.

On the 10th January, a considerable force of the French crossed the Waal above Nijmegen on the left of the Allies, while another body struck at the point of junction of the Austrians² and British. As the result of these movements, the British Army, under Abercrombie, crossed the Rhine at Rhenen, retired through Gelderland and Overijssel into Germany, and embarked at Bremen for England on the 12th April, 1795, having suffered terrible hardships in its retreat through a bleak and sterile country. Gorinchem or Gorcum and Utrecht fell on the 12th of January, and on the 20th Pichegru entered Amsterdam, his success being finally due to a revolutionary movement excited by some "exiles" of 1787, and by other republicans. After this conquest the new "Republic of Batavia" preserved a semblance of independence, rendered dubious, however, by the undesired presence of an army of 36,000 men, who were "to protect it against the attempts which the Prince of Orange might make to endanger its liberty." The Head of State was styled "Grand Pensionary," and his rule endured until 1805, when Louis Buonaparte was created King of Holland. This Prince reigned until 1810, when Holland was finally annexed to the Empire.

In 1813, the Russian and Prussian Armies, under Winzingerode and Bülow entered Holland from Germany, having been detached by Bernadotte after the battle of Leipsic. Encouraged by their arrival, the Dutch everywhere rose against the French; on the 23rd of December Winzingerode and

¹ In this affair Wellington was for the first time under fire.

² These had been sent from the Rhine at the request of the Duke of York.

Amsterdam, the independence of the country was proclaimed, and the Prince of Orange recalled.¹

The possession of Amsterdam by the Russians turned the flank of the French position at Utrecht, and the latter fell back on Gorcum. Willemstadt and Breda shortly capitulated, as did also Geertruidenberg, and the French were by the end of the year in possession only of a portion of Zealand, and of the fortress of Bergen-op-zoom, which in 1814 was the scene of the gallant but unsuccessful attempt of Sir Thomas Graham.

The Dutch under the Prince of Orange took a prominent part in the battle of Waterloo; and at the Congress of Vienna, Holland and Belgium united into a kingdom, were given to the Dutch leader, who ruled under the title of William I.

But the Dutch and the Belgians differ essentially in religion, in language and in temperament, and it was soon found that an artificial union was impossible between two peoples so dissimilar. The quarrels and disagreements between them culminated in the Revolution of 1830, which, though first kept under by the action of the Dutch troops, was encouraged by France and eventually received the assistance of a French Army.

After a struggle, short indeed, but memorable for the defence of the citadel of Antwerp by General Chassé, Belgium was separated from Holland, and erected into an independent kingdom.

Holland has of late years taken no part in European complications, but in 1870, with the view of protecting her neutrality, mobilized the greater part of her army, a proceeding which led to the discovery of many imperfections and faults in her military system.

III.—THE ARMY, FINANCES, &c., OF HOLLAND.

The extreme length of Holland from north-east to south-west is about 110 miles, and its breadth from east to west 123 miles; the area of the kingdom is 12,680 square miles, excluding Luxemburg, of which the King of Holland is the Grand Duke.

The population of the Netherlands amounted on January 1st, 1880, 4,060,578 souls, of whom two-fifths were Roman Catholics and 70,000 Jews the remainder being Protestants.

The national debt in 1881 amounted to about 83,000,000*l.*; the condition of the finances can be best understood from the following tables:—²

<i>Expenditure for 1880.</i>				<i>£</i>
1. King's Civil List	....	....	....	62,500
2. State Councils, &c.	....	....	....	51,324
3. Foreign Office	....	....	....	53,074
4. Justice	....	....	....	370,633
5. Home Office	....	....	....	623,572
6. Admiralty	....	....	....	1,050,962
7. National Debt (interest)	....	....	....	2,371,389
Finance Department	....	....	....	1,515,191
8. War Department	....	....	....	1,716,666
9. Department of Canals, &c.	....	....	....	1,647,668
10. Colonial Department	....	....	....	120,085
11. Unforeseen expenses	....	....	....	4,166
Total				£9,587,230

These expenses include a sum of 60,000*l.* devoted to the gradual extinction of the national debt.

¹ The last Stadhouder had died in exile in 1806.

Calculated at the rate of 12 gulden to 1*l.*

Revenue for 1880.

	£
1. Taxes on land, income, capital, &c.	2,037,620
2. Excise	3,231,250
3. Indirect taxes	1,871,050
4. Stamp duties	384,253
5. Duty on gold and silver	28,000
6. Domains....	135,416
7. Post Office	312,500
8. Telegraphs	70,500
9. State Lotteries	35,833
10. Fisheries, &c.	12,166
11. Pilotage	75,000
12. Dividend from State Railways	131,000
13. Various receipts	667,265
Total	£8,991,853

Total Expenditure	£9,587,230
Total Revenue	£8,991,853

Deficit £595,377

This deficit is, however, lessened by the receipts from the Colonies, w^h the Dutch have succeeded, on some principle peculiar to themselves, in making a source of income to the mother country; the receipts from this source w^h in 1878 only about 200,000*l.*, but in 1875 they were nearly 2,000,000*l.*, accordingly we find that the latter was the last year in which there w^h surplus to the Budget.

For the Excise are taxed sugar, wine, spirits, salt, soap (!), beer, vine and butcher's meat, while, strange to say, the taxation of tobacco, carriages, lace, servants, and other luxuries does not appear to recommend itself Dutch statesmen.

The Army of the Netherlands.

The Dutch military system is original and peculiar, and should be of interest to us, since Holland suffers from the same military difficulties as England, namely, the want of recruits, and the necessity to supply troops for her very disproportionately large external possessions. If we consider the latter, we find that the Dutch, unlike ourselves, devote two separate distinct forces, one to Home, the other to Colonial service; but the reason to believe that, were it not for the fear of still further diminishing numbers of voluntary recruits, they would be only too glad to employ their army on universal service.

Of the colonial army it may be sufficient to say that it consists of—

(1) The East Indian Army of about 30,000 men, of whom about 13,000 Europeans.

(2) The West Indian detachment of about 600 men.

Recruits for both forces are obtained by voluntary enlistment, for which maximum bounties are as follows:—

East Indies—				£	s.	d.
A Netherlander,	4	years' engagement	....	16	13	4
"	6	" "	....	25	0	0
A Foreigner,	4	" "	....	8	6	8
"	6	" "	....	16	13	4

West Indies—	£	s.	d.
Army recruit, 6 years' engagement	25	0	0

The East Indian Army is stationed at various point in Sumatra, Borneo, and the Moluccas, while the West Indian troops occupy Surinam, Curaçoa. In the East Indies there is, in addition to the numbers above, an auxiliary force of about 10,000 men.

Although the Constitution of Holland fully recognizes that it is the duty of every man to bear arms, in case of necessity, in the service of his country, the spirit of the Dutch people is so strongly opposed to military service that this principle has never been worked out to its logical ending, and the army of Holland is therefore in theory supplied by voluntary enlistment.

In practice this system is a complete failure, in spite of the high bounty given to recruits, which vary, as a maximum, between £5 and £10. Proof of this statement it may be mentioned that the total number of voluntarily enlisted was on the 1st July, 1880, as follows:

Infantry	....	....	....	810
Cavalry	....	....	....	1,433
Artillery	....	....	....	824
Engineers	....	....	....	267
Total	....	....	....	3,334

A voluntary recruit enlists for not less than six or more than twelve years. Non-commissioned officers and soldiers may at any time re-engage for a number of years not exceeding twelve.

Recruits must be between the ages of eighteen and thirty-six years, if they have served already, in which case they may be taken up to forty.

No recruit is accepted, except as a drummer or bugler, who is not less than 5 feet 1½ inches in height.

The number of voluntary recruits being so exceedingly small, it is necessary to fill up the army from the national militia, and it would, in point of fact, be simpler to say at once, that Holland has no *army*, in the ordinary sense of the word, but possesses only such cadres as enable the War Department to maintain yearly a certain number of militiamen through a short course of retraining.

It was originally intended that this militia contingent should be made up partly of volunteers, and partly by conscription, but it has been the practice that no volunteers ever come forward, and the whole is thus supplied on the latter system.

The annual contingent under the law of 19th August, 1861, was for 11,000 men, but a new law was introduced in September, 1881, which reduced this number to 12,600. In either case we must deduct 600, as the number of recruits who are sent to the navy.

A militiaman is liable for service during five years:¹ therefore under the new law the number in the army will be about 60,000, in the navy, 3,000.

The militia contingent is supplied by ballot among the young men who enter their twentieth year on the 1st of each January, and those registered, for this purpose, during the preceding year.

Every man is liable to service:—

(1) If his father, or if he be dead, his mother, or if both be dead, his guardian is a native of Holland; or

(2) If he has no parents or guardians.

The following are exempted from service:—

¹ Not including non-commissioned officers.

² In time of peace. See *post*.

- (a) If of less height than 5 feet 1 inch.
- (b) If medically unfit for service.
- (c) An only son (if legitimate).
- (d) Who is already in Government employ.
- (e) Who is a midshipman or cadet.
- (f) Who was trained in a Government school as a surgeon or veteran surgeon.
- (g) Who has served five years as a volunteer, in a lower rank than that of an Officer, in the navy or army, at home or abroad.
- (h) Whose brother or half-brother is serving or has served (in a lower rank than that of an Officer), either in the militia, or as a volunteer in the navy or army at home and abroad.

If the number of sons in a family be even, half, if odd, the smaller half, liable to serve.

The clergy and students in divinity, and others under special circumstances may, on application, obtain exemption from actual service for one year; exemption may, on further application, be annually renewed.

Men who have been dismissed from the army or navy, or who have received any degrading punishment, are not allowed to serve.

The total number of those liable to service was, in 1879, 33,262, of whom

1,357	were under the standard of height,
2,708	were exempted as medically unfit,
4,639	„ „ as only sons,
10,257	„ „ on account of brothers' service,

Total 18,961

leaving a residue of 14,301, of whom 10,894 were taken, out of which 600 the navy.

The full contingent was 11,000, but 106 deserted. It is interesting to note that 2,096 applied to be posted to the navy, while 1 (!) volunteer for the army, showing plainly which of the two is the popular service.

Substitutes are permitted, and are divided into two classes, viz., "number-changers" and "place-changers."

The substitute provided by place-changing (*plaats-vervanger*), must be native, fit for service, at least 5 feet 1½ inches in height, between twenty-one and thirty-five years of age, and of good moral character. He must also be unmarried or a childless widower, and have further fulfilled his own service in the militia. If he has served in the army or navy, he can show a certificate of good character, he is accepted up to the age of forty years.

The substitute by number-changing¹ (*nummer-verwisselaar*) must belong to the same levy of the same province as the conscript whose place he takes and must be fit for service.

The conscript who changes numbers with a substitute is entirely free, but he who changes places is, should his substitute desert, liable during one year to find a new substitute, or to serve himself.

The ballot for the militia is held annually between the 7th February and the 7th March at such places as the King's Commissioners may appoint, and each "commune" contributes its quota according to the number of inhabitants, and the number of men which it has already supplied to the Militia; the contingent to be furnished by each province is officially published by the King in the "Staats blad," or Gazette, and that for each commune in the provincial states, in the local Gazette.

¹ The substitute who has drawn a good number in the ballot exchanges it for a bad one.

A militiaman is liable to service for five years in time of peace, but in case of war or other extraordinary circumstances, his service can be prolonged by a law passed annually for that purpose. He may not, except by his consent, be sent to the Colonies or foreign possessions.

The King has the power in case of emergency to call out the whole or of the militia, but must at once assemble the States-General, if they be sitting, in order that this act may be legalized.

The militia is liable to be called out once every year to be drilled during six weeks, but the King may, if he please, declare this unnecessary.

The duration of the first training is twelve months, but those who have passed through a certain educational course may, if they have acquired a knowledge of theoretical and practical military work, be dismissed on unlimited furlough after six months. After the first training, the whole of the year is allowed to go on unlimited furlough for the remainder of the term of service, subject only to their liability to be called out, should it proceeding be considered necessary.¹

In practice, a portion (about one-seventh) of the annual levy is kept with colours for sixteen months, or until the levy of the succeeding year is sufficiently trained to do duty.²

In a pamphlet lately published, an Officer of the Dutch Army proposes to free the militia levies from all duties except drill parades, and that the drill shall take place twice in the day. He hopes thus to be able to reduce the length of the training to eight months, a change which he considers would be both economical and popular. This is probably true, but on the other hand it must be urged that the training of a soldier implies more than the learning of drill, and even sixteen months does not appear a long period of instruction when the task of the Officer or non-commissioned officer is to transfer a crowd of unruly louts into cleanly, obedient, and well-disciplined soldiers.

Under the new law for the militia which was presented to the States-General in September, 1881, it is ordered, in addition to the changes above :—

That the Ballot shall be held in March, and the conscript be called out during the first half of October;

That the larger half of an odd number of brothers shall be taken;

That the age of a substitute, by place-changing, shall be between twenty-two and thirty;

That every recruit shall receive furlough during some part of his year's training;

That one-sixth of the five levies can be kept under arms if required in addition to those serving their first year.

In addition to the army and militia, there exists in the Netherlands an auxiliary force, named the "Schutterij," which goes back for its origin to the sixteenth century, but was almost entirely remodelled by law in the year 1814.

Every native male is bound to serve in the Schutterij for ten years, namely from the twenty-fifth to the thirty-fifth year of his age, and of this period he passes five years in the Active Schutterij, and five in the Reserve.

"commune" is required to have 2 per cent. of its male inhabitants in the Active Schutterij, but if the total number of inhabitants of any commune

¹ This is the regulation for 1881; the rules for 1880 were even less stringent.

² By law one-seventh of the five contingents of the militia, in addition to those who are undergoing their first training, may be kept under arms.

³ "De Aanhangige Militie en Schutterijwet getoetst aan onze Militaire finantieel belangen," door een Infanterist.

⁴ "Gemeente."

HOLLAND AND THE DUTCH.

less than 2,500, its members serve only in the Passive Schutterij.¹ Vacancies in the ranks are annually filled by ballot, but number-changing is permitted within limits.

The Schutterij is organized in three bans—

1st. The unmarried, and the childless married men and widowers.

2nd. Married men and widowers who have small families, and who are not absolutely dependent upon their profession, &c., for their support.

3rd. The remainder of the Schutterij.

It is laid down by the Constitution that, as soon as the whole of the militia has been called out, the Schutterij are to be mobilized and drilled. The auxiliary forces are liable to service in the following order:—

1st. Any volunteers who offer for service.

2nd. The unmarried, or, if necessary, the whole of the 1st ban.

3rd. The 2nd ban.

4th. The remaining members of the Schutterij.

5th. In the case of the most urgent need the "Landstorm."

The assembly of the last must, however, be accompanied by an extraordinary meeting of the States-General, in order that its necessity may be solemnly declared. The Landstorm is subject to the following rules:—

1. The Landstorm, or that part of it which is first available for service, shall be employed to fill up the army and train, and shall be in all ways paid, rationed, and rewarded as is the army.

2. Under no circumstances can the Landstorm be required to serve beyond the frontiers of the kingdom.

3. All place-changing is forbidden in time of war.

The Landstorm receive no military training, and that of the Schutterij is present little more than nominal;² but it is proposed to improve the present system, and to give the latter instruction, both theoretical and practical.

It was further ordered in 1867 that whenever more than ten persons form a society to practise rifle-shooting, they shall, if the King's consent be obtained, be supplied by the Government with the necessary ammunition and if possible with arms, and with instructors from the army.

By the new law for the Schutterij proposed to the States-General in September, 1881, the following rules are made:—

All males are liable to service from the 1st January of their twentieth year and are to be called up in the January and February of their twenty-first year. The enrolment, which is for ten years, is to take place in March. Not enrolled at an earlier date every man is liable to service up to his thirtieth year; but the term of ten years is in any case to include militia service.

Volunteers are received, provided that they enlist for at least two years in peace, and serve in war as long as they may be required.

The following are exempted:—

1. Those who fail in height or health.

2. Those who have served ten years in the army, navy, &c.

3. Some Government officials.

4. The clergy and theological students.

The Schutterij is to be divided into two classes, viz.:—

(a) Those who are sufficiently trained: these are to attend drill for an aggregate of from forty to fifty hours in the year.

(b) Those insufficiently trained, or entirely untrained, who are to be drilled during from ninety to one hundred hours in the course of the year.

¹ "Rustende." They do no drill.

² The Active Schutterij is assembled at the most for one hour once a fortnight between April 1st and October 1st, for drill and ball practice.

*The Organization and Strength of the Army.¹**Infantry.*

(a) 1 Regiment of Grenadiers and Jagers.

(b) 8 Regiments of Infantry of the Line.

Each regiment consists of 5 battalions, of which, in the case of (a), 3 are grenadiers and 2 jagers.

Each battalion consists of 4 companies, of 1 Captain, 3 subalterns, and 210 rank and file, and has a total strength of 20 Officers and 932 men.

Each regiment consists of 107 Officers and 4,660 men.

It is intended that there shall be the following proportion between volunteers and militia, viz. :—1 to 5.

Volunteers : 35 per company = 140 per battalion = 700 per regiment, and total 6,300. Militia : 175 per company = 700 per battalion = 3,500 per regiment; with a total of 31,500.

This will give a grand total of—

37,800 rank and file ; add to this

1,404 serjeants.

1,676 corporals.

936 Officers of all ranks.

41,816 grand total.

The Infantry is organized in three divisions, each of fifteen battalions.

1st Division : Regiment of grenadiers and jagers + 4th regiment + 7th

2nd Division : 1st regiment + 5th regiment + 8th regiment.

3rd Division : 2nd regiment + 3rd regiment + 6th regiment.

In addition to the above there is a battalion of instruction, and a discipline battalion ; the Hospital Corps is also included among the Infantry.

Cavalry.

3 regiments of Hussars, each of 5 field squadrons and 1 depot squadron. A field squadron consists of 1 Captain, 4 subalterns, and 190 rank and file, whom 80 are volunteers and 110 militia ; total, including non-commissioned officers, &c., 223, with 10 Officers' chargers and 120 horses.

A regiment, including the depot squadron, consists of 44 Officers and 1,2 non-commissioned officers and men, with 77 chargers and 746 troop horses. Under the head of "Cavalry" are included also the riding and farriery school and a squadron of 100 rank and file, termed "Ordonnansen," whose special duty it is to provide orderlies and escorts.

Artillery.

(a) A corps of Horse Artillery, consisting of 2 batteries of 6 guns each and one battery of instruction.

Each battery comprises 1 Captain, 3 subalterns, and 156 rank and file, whom 40 are volunteers, and 116 militia ; total : 4 Officers, 180 non-commissioned officers and men, 8 chargers, 127 troop horses.

The battery of instruction contains 1 Captain, 1 subaltern, 160 men, 4 chargers, and 58 troop horses.

(b) 3 regiments of Field Artillery, of which each regiment consists of 2 divisions ; one of 4 batteries of 6 guns, the other of 2 batteries of 6 guns, and 2 companies of the Train.

A battery contains 1 Captain, 3 subalterns, and 136 rank and file, whom 20 are volunteers and 116 militia ; total : 4 Officers, 161 non-commissioned officers and men, 4 chargers, and 70 troop horses.

¹ In all cases these are given at the full (paper) war strength, and perhaps represent more what is wished than what exists.

A company of the Train consists of 4 Officers, 189 non-commissioned officers and men, 4 chargers, and 45 troop horses.¹

- (c) 4 regiments of Garrison Artillery, of which one is trained especially for coast defence; each regiment consists of 10 companies.

Each company contains 1 Captain, 3 subalterns, and 162 rank and file of whom 12 are volunteers, and 150 militia; total, with non-commissioned officers, 4 Officers, 183 men.

There is also a company of instruction, which consists of 1 Captain, 5 subalterns, and 227 non-commissioned officers and men.

To the Artillery also belong—

- (d) The Pontoon Trains of 2 companies, each of 4 Officers and 260 non-commissioned officers and men, of whom 205 are militia.

These should rather be described as a bridging train, as they have wagons or horses, nor apparently any portable pontoons.

- (e) The Torpedo Corps, which is principally recruited from fishermen. It consists of 2 companies, each of 4 Officers, and 219 non-commissioned officers and men, of whom 150 are militia.

There is also a company for training non-commissioned officers, and a company of artificers.

Engineers.

- (a) 3 field companies of 3 Officers and 159 men (90 militia).

- (b) 8 fortress companies of 3 Officers and 166 men (90 militia).

- (c) 1 railway and telegraph company of 6 Officers (5 subalterns) and 184 men (90 militia).

- (d) 1 dépôt and instruction company of 3 Officers and 208 men.

Proposed Organization of Field Army.

1 Cavalry Brigade of 3 regiments of 3 or 4 squadrons + 2 batteries heavy artillery.

3 divisions, of which the headquarters would be at the Hague, Arnhem, and Breda.

Organization of a Division.

Infantry—3 regiments of 4 battalions.

Cavalry—1 or 2 squadrons.

Artillery—1 regiment = 36 guns.²

1 company of Engineers.

1 company Hospital Corps.

There will then remain for the fortresses, &c.—

9 battalions of Infantry.

4 regiments = 40 companies of Garrison Artillery, 3 companies Engineers, and the Torpedo company.

Nominal strength of the Army by the Organization of July, 1880.

Arm.	Officers.	N.C.O's.	Volunteers.	Militia.	Total.
Infantry	926	3,080	6,300	31,500	40,806
Cavalry	121	480	1,655	1,650	3,706
Artillery	416	1,185	1,213	9,930	12,744
Engineers	92	143	400	785	1,320
	1,555	4,893	9,568	43,865	58,321

¹ Mostly cast from the Horse Artillery and Field Artillery or Cavalry. Only 4 batteries would be ready at first.

Of these 6,234 volunteers were wanting, of whom 5,490 were needed by the infantry.

Probable strength of Field Army.

Infantry, 36 battalions $\pm$ 820 men = $\pm$ 29,500 men.
 Cavalry, 15 squadrons $\pm$ 125 men = $\pm$ 1,875 "
 Artillery, Horse $\pm$ 300 men and 12 guns. "
 " Field $\pm$ 2,009 " " 108 "
 Total, 33,675 " " 120 "

Infantry : cavalry :: 15 : 1.

Guns, 3·6 per 1,000 men.

The Schutterij has¹ the following strength :—

Active, 212 companies, of which 27 are Garrison Artillery.

Passive, 89 battalions, divided into 385 companies.

	Active.		Passive.	
	1st ban.	2nd ban.	1st ban.	2nd ban.
Officers	434	159	607	387
N.C.O. and drummers ..	1,610	726	2,254	962
Privates { active ..	15,249	5,430	32,098	6,036
{ passive ..	10,153	8,259	20,073	13,666
	27,451	14,574	55,122	21,051

Of these have served in the army,

As N.C.O.	621	254	310	160
As Privates	7,144	2,955	12,233	5,249
	7,765	3,209	12,533	5,409

giving a total of 118,198, of whom 28,916, or about one-quarter, have served.

Weapons of the Dutch Army.

Infantry. The Beaumont rifle, which is a breech-loading central-fire arm having a calibre of '433", rifled with four grooves, sighted to 2,000 yards, and with an initial velocity of 1,332'. Length with bayonet fixed 72", without the bayonet 52". Weight, with bayonet 10·5 lbs., without 9·7 lbs.

The cartridge is of brass, the charge weighs 77 grains, and the bullet 378 grains.

Entrenching tools are to be supplied in the proportion of 40 shovels and 16 hatchets, and 2 pickaxes to each field company.

Cavalry. The Remington carbine, a breech-loading arm, of which the calibre is also '433"; it has four grooves and is sighted to 500 yards. Its weight is 7·1 lbs., and its length 36". The charge weighs 65·5 grains, and the bullet 336 grains.

The cavalry sword is 40·1" in length, and weighs with its steel scabbard 4·4 lbs. Non-commissioned officers and trumpeters carry a revolver weighing 2·8 lbs.

¹ 1st January, 1880.

Artillery. The dismounted men wear a special short sword, with a leath scabbard.

The mounted men have the cavalry sword (as above), and the limber gunners the old pattern cavalry sword 39 inches in length, and weighing 5·1 lbs. with its steel scabbard.

The field and horse artillery, carry also a revolver.

The guns at present in use are bronze breech-loading wedge guns, and are on iron carriages. The calibre is 3·3", and there are twelve grooves. The shells are provided with a lead coating and rings, and are of the following descriptions :—

Common shell, used with a percussion fuze; weight, filled 13·1 lb bursting charge 7·7 oz.

Shrapnel shell, with 80 lead bullets, weight 14·8 lbs., bursting charge 2 c used with a time-fuze.

Case—108 bullets, weight 13·4 lbs.

The charge is 1·8 lbs.

Each limber carries 30 common shell and 12 shrapnel, and four rounds case are with the gun.

In each wagon are 72 common and 32 shrapnel shell.

With the batteries are carried 151 rounds per gun, with the ammunition column 53 per gun for Field Artillery, 70 for Horse Artillery.

The extreme range of the gun is about 3,300 yards.

Two gunners are carried on the axletree boxes and three on the limber.

The guns and wagons have each six horses, the other carriages four, and the weight drawn by each horse is, in the Horse Artillery 700 lbs., in the field batteries 800 lbs.

Engineers are armed with a special carbine and sword. Carbine, almost the same as that of the cavalry, but sighted to 650 yards, and provided with bayonet. Sword, a broad heavy blade, which may serve as a pioneer's tool; they also carry pioneers' and carpenters' tools in a bandolier over the left shoulder.

In war the infantry carry 60 cartridges each, the cavalry 30.

The Schutterij are at present armed with the Snider rifle, but are to receive the infantry arm as soon as a sufficient number have been made.¹

Provision was made in the estimates of 1880 and 1891 for the purchase of 120 steel field guns of 3·3" calibre.

Supply.

In time of war the principal magazines will be at Amsterdam, Woerden and Dordrecht, with depôts for clothing and equipment, &c., at Amsterdam, Woerden, and Delft. Military bakeries will also be established at Leeuwarden, Groningen, Deventer, Harderwijk, Milligen, Arnhem, Nijmegen, Grave, Venlo, Maastricht, Amersfoort, Hertogenbosch, Naarden, Utrecht, Gorinchem, Breda, Amsterdam, Haarlem, Hoorn, The Hague, Bergen-op-Zoom, and Flushing.

It may not be out of place to state here the impressions given by what was seen of the Dutch Army during a short tour in Holland.

The infantry are small men, but look strong and healthy; they are certainly not smart in appearance, but that may in some degree be owing to the fact that they seldom appear in any other dress than a long ill-shaped great-coat. Their drill to English eyes appears slack, and is apparently modelled rather on the French than the German system; but one point appears worthy of note, which is, that battalion drill, in place of being carried out on a level parade, was in one case at least executed on a ve

¹ On the 1st January, 1880, 137,863 small-bore rifles were ready.

broken piece of ground. The Officers are very smart in their dress manner, but the men are, as a rule, loutish. The uniform is dark blue, with utterly useless aiguillette fastened to the left shoulder, while the shako might by their shape be relics of Waterloo, and are surmounted, at least the grenadiers, by a very conspicuous white plume, which is, however, probably removed in the field. As a measure of the size of the men, it may be mentioned that in no one case was any man seen who, even in a shako, was not overtopped by his bayonet when holding his rifle at "order." The cavalry are even smaller than the infantry, and their swords look very much out of proportion to the wearers. Their uniform is dark blue with red braid, and their busbies and overalls are of the French exaggerated pattern. In general appearance the cavalry are certainly inferior to the infantry, and do not give a favourable impression, whether mounted or dismounted, though such horses as were seen were excellent well cared for.

The men of the artillery were better set up, looked more intelligent, were far more soldierlike than those of the other arms; they appeared in almost as if recruited from another class. No horse artillery were seen, such horses of the field batteries as came under notice were very good, groomed, and most serviceable.

The Officers in all arms seemed bigger than their men, but this may be the effect of the youth of the latter. Every non-commissioned officer wearing a medal, and therefore of some length of service, was noticeable among the others by his very soldierlike appearance. The Dutch Officers wear their swords well, and do not, as is too often the case with us, allow them to hang more nearly horizontal than vertical; but in the matter of length of straps the mounted branches of the Dutch Army are far more profuse.

The above statements are given only as impressions, and are liable to correction, since the specimens of the army seen may have been in no way representative.

The Navy.

The dockyards, storehouses, &c., are at Amsterdam, Hellevoetsluis, Willemsoord at the Helder, and there are two harbours for the navy, namely Hellevoetsluis and the Nieuwe Diep, at the Helder.

The strength of the navy in August, 1879, including the ships then on stocks, was as follows:—

1. For the defence of the Coasts and Roads.

23 ironclads, one of 6 guns, one of 4, one of 1 gun, and the remainder of 2 guns each. Draught of water from 4' 3" to 19', with horse power ranging from 50 to 400, and carrying from 40 to 152 men.

30 unarmoured iron gunboats of 1 gun each.¹ Draught of water 6 feet, with engines of 30 horse power and each with a crew of 22 men. Also 1 steel boat, carrying 2 guns, drawing 3' of water, and having a crew of 10 men.

It is intended that the smaller of the above, with others of the same type which are to be built, should assist in the inland defence, and for this purpose a large canal is to be made from the Zuider Zee to the Hollandsch Diep, connecting Amsterdam, Utrecht, and Willemstad, by way of the Vechter, the Lek and the Merwede.

2. For General Service.

Two ironclad rams, carrying their guns in turrets, built of iron, and

¹ 16 have the 28 c.m., and 14 the 23 c.m. gun.

carrying 8 guns. Draught of water 19'6" and 18', horse power 600 and 400, crews 250 and 230.

Unarmoured ships, &c., seven of the 1st class, of from 10 to 14 guns drawing 18' to 20' of water, with engines of from 250 to 500 horse-power, and with crews of about 200 men.

Two of the 2nd class, of 6 guns each, drawing 16' of water, with engines of 280 horse-power, and crews of 130 men.

Three of the 3rd class, of 3, 6, and 7 guns respectively, drawing 14'5" of water, of 119 to 140 horse power, with crews of 100 men.

Four of the 4th class of 3 or 4 guns, with a draught of water of 11'5", of 90 horse-power, and with crews of 75 men.

Under this head come also an old frigate (screw) of 51 guns, and a paddle steamer of 6 guns.

3. *Guard Ships. (Sailing Ships.)*

7 of from 2 to 12 guns, consisting of 2 frigates, 1 corvette, and 3 gun boats for instruction.

2 frigates, 2 corvettes, 1 brigantine, 2 brigs, and a gunboat.

Omitting those vessels which come under the last head, the strength of the navy was, therefore, in 1879—

(a) *For Coast and Inland Defence:*

Armoured	28 vessels of 53 guns.
Unarmoured	31 " 32 "

(b) *For General Service:*

Armoured	2 vessels of 16 guns.
Unarmoured	18 " 178 ¹ "
Total	79 279. "

The rifled guns in use are the

28 centimetre, or	11" gun, of which there are	23
23 " "	9" " "	44
18 " "	7" " "	6
17 " "	6'6" " "	18
16 " "	6'3" " "	49
15 " "	6" " "	3
12 " "	4'7" " "	75
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The remaining guns on board ship are S.B.

Personnel of the Navy.

Omitting the Surgeons and non-combatant officers, &c., the navy consists—

1 Admiral.
2 Vice-Admirals.
4 Rear-Admirals.
20 Captains.
40 Commanders.
120 Lieutenants, 1st class.
225 " 2nd "
50 Midshipmen.

462 Officers and 5,601 petty officers and men,

¹ Omitting the frigate, 127 guns.

which last 1,272 are militia. The Corps of Marines¹ consists of 3 batta of 4 companies each, and a depôt company; it has a strength of 56 Of and 2,186 men.

A conscript of the militia who volunteers and is accepted for sea serves four years, and is on his discharge relieved from any further duty the Schutterij. The sea militia are not, except in case of necessity, called upon to serve in the Colonies, but must pass the whole of their year on sea service, unless exempted from it by the King. After their year of service the sea militia are not liable to be called out for more six weeks in any one year.

In case of war the sea militia may be called out either wholly or in but this summons is always to be immediately followed by the assembly the States-General, and is to be authorized by them.

IV.—THE POLITICO-MILITARY POSITION OF HOLLAND.

In order fully to realize the various changes that have been undergone the foreign relations of the Dutch, it is necessary to describe briefly position in former years with regard to the rest of Europe.

Every one has read of the magnificent struggle with Spain by v Holland was first raised to the position of an independent Power, and v continued during the latter half of the sixteenth, and the earlier half the seventeenth, century.

During the remainder of that age Holland had two special foes, France land, and England by sea. Germany was occupied by internal dissension Austria suffered from the incursions of the Turks and from the rebellion Hungary, while Prussia was as yet in the infancy of its power. France on the other hand, ruled by a young King, eager for military glory, though report be true, a little sparing of his person, who found ready to his an army formed by Richelieu and kept up by Mazarin. The international condition of the country was all that even Louis XIV might desire, the great vassals of the Crown, whose forefathers had so often striven with success to drive his ancestors from the throne, were now perfect courtiers, whose highest happiness was gained if the "Grand Monarque" deigned to smile on them. England, on the other hand, was beginning to feel her strength; few in number, her armies had done little since the day of Agincourt, but her navy, created and trained by the rash ventures of her heroes, was fast rising in importance in the consideration of the world was impossible that two nations, lying so near together, and separated by sea, of which both claimed the mastery, should long remain at peace.

Accordingly we find that the annals of Holland at this period are with naval battles with England, while the French, as before mentioned, strove to extend their frontier to the Rhine, which then as now they claim for their natural boundary.

In the eighteenth century, it is still the French from whom Holland most to fear, and against whom we find her striving in alliance at various times with the English and Imperialists. To cover the southern frontier of Holland many fortresses were built, that at last a campaign became practicable succession of sieges. At length France, grown feebler and feebler from waste of her finances, was driven within her bounds, only to issue forth after the bloody challenge thrown by her in 1793 to the Kings of the world.

Holland in 1795 became a province of France, at once in fact, at least in name, and so remained until the great European convulsion which 1 Napoleon from his throne, and restored to her her independence, but with debts, incurred for wars which she had not desired.

¹ As organized on 1st September, 1830.

In 1815 all Europe feared France, and it is interesting to note how every effort of the Congress of Vienna had but one aim, to make the egress of the French Army from French territory as nearly as might be impossible, by engaging the interests of each of the other nations against such an advance. Switzerland was placed, as a neutral country, under the protection of all in touching her France would draw on herself the enmity of Austria, and of Germany: the latter with Prussia guarded the middle Rhine, while Holland and Belgium, as the kingdom of the Netherlands, was a sufficient Power to cover the right flank of Germany; England also, it was understood, would resist any action in this direction, and the Allied Powers were bound by treaty to furnish 60,000 men to aid in the defence.

A grand system of defence was decided upon in 1818 at Aachen or Aix-la-Chapelle, and its plan was entirely directed against France.

In order to ensure the co-operation of England nine fortresses were to be kept up, and of these, in case of any threat of war, six were to be occupied by English troops.

A second series, of ten fortresses, was intended to facilitate the intervention of Prussia, and of these in case of war the latter was to hold five.

Three other fortresses closed the space between the Scheldt and the Maas, and of these the Dutch were to occupy two, and Prussia one.

A fourth system held by the Dutch was to cover Holland, which lastly was to serve as a central *réduit*.

It has not been considered necessary to give the names of these fortresses since the whole system fell to pieces in 1830, at the separation of Belgium from Holland, and also because not one of these strongholds, with the exception of modernized Antwerp, exists at this moment as a fortress.

Thus in 1830 Holland was thrown back on her own resources for defence and from that date until the present day efforts, at first spasmodic, but lately systematic, have been made to work out an adequate system for her protection.

In 1830 Holland yet feared France; she had long given up the struggle with England for supremacy at sea; her southern neighbour was hostile but harmless Belgium, while Hanover, still an appanage of the Royal House of England, sheltered her on the east from insult or injury.

So matters continued until the sudden success of Prussia in 1866, and the consequent absorption of Hanover by that Power, gave the Dutch a new neighbour, too warlike to be neglected, and too covetous to be loved.

The attention of the Dutch was, therefore, at this date directed principally to their eastern frontier, and the southern, between which and Belgium served as a shield, was comparatively neglected. If the weight of Prussia in the minds of the Dutch more than counterbalanced that of France in 1868, how much more, after the war of 1870, must the influence of the latter have become a matter of history, while that of the former darkened the country like the shadow of a threatening giant.

But, it may be asked, why should Prussia desire to annex Holland? To this the answer is easy, or rather there are many answers. Prussia, poor as warlike, is earth-hungry; she has so increased of late, that she believes to be her mission to spread until her realm is bounded by the sea. Even there she will not rest; she has now such an army as the world has probably never before seen, so organized and so trained that she does not look upon defence as possible, but she has as yet comparatively no navy, at least none such as she would make had she a sea-board and a population of sea-going men. With her army she proposes to rule Europe; with a navy she thinks she might rule the world.

Prussia has two harbours for her navy, Kiel and Wilhelmshaven, of which the principal, the former, lies in the Baltic, and may thus be practically closed by a fleet blockading the narrow entrance of that sea. She is further

dependent for her supply of sailors on the population of her northern coast which lies on a sea that for many months of the year is ice-bound. The annexation of Schleswig-Holstein has undoubtedly served to make a step possible to Prussia, and therefore to Germany, but a far greater development is needed before the latter can have much weight in the world in naval matters.

Again, who shall say whether the Prussians, as a race, have the genius for maritime war, in which the French, who also in their time have been supreme on land, are naturally deficient? But the Dutch are born sailors, as we have learned in many a naval fight, and Prussia, who needs no addition to her army, would rejoice to add to her dominion a province of which the people would supply the very best material for that part of her force which is undoubtedly the least efficient.

The spirit of colonial enterprise, choked in Germany by the small extent of her coast, has always flourished and still flourishes in Holland. This little State, whose total population is no greater than that of London, is the second colonial Power in the world, and rules dependencies of the area of 600 square miles, and containing 24½ millions of inhabitants, and, stranger than fiction, rules them with a distinct profit to the State.

Must not a small nation, so decked with rich possessions, be a constant temptation to her powerful but poor neighbour, who daily sees thousands of her sons quit her shores and abandon her nationality for those of other lands which have more promise or more wealth? Had Germany a navy she would soon have Colonies; had she Colonies those who now leave the Fatherland for foreign countries might be induced (or perhaps compelled) to live under the German flag in other latitudes, and who can doubt but that the thrifty, practical Prussian would succeed in a new country where what are most needed are economy and energy?

Holland has Colonies, harbours, and a navy, the latter indeed small, but large numerically as that of Germany, while Prussia, lacking all these, has a giant army, needing war as an excuse for its existence, is not overburdened with sickly scruples, has a way of spelling "might" as "right," in defiance of orthography, and is divided from Holland by a merely artificial frontier. May we not then assume that the temptation to annex Holland always exists for Prussia, and, judging by past events, is it too daring to prophesy that given the opportunity, Prussia is no prude to resist indefinitely?

With regard to the feelings of the Dutch on this matter, that is shown most plainly by the sacrifices to which they submit for the purpose of defending their land. They are confessedly not a military people, and proud to be merchants and farmers rather than soldiers; yet, with but few exceptions, they are eager to lend their aid to any scheme which may preserve their independence, even though that scheme may entail, as in the case of military inundations, the temporary loss and the slow and expensive reclamation of many thousands of acres of fruitful land.

The national and anti-German feeling is, as might be expected, stronger in the west or heart of Holland. On the eastern frontier, for many years, communication was frequent with Hanover, and labourers crossing and recrossing the boundary grew to greater likeness in speech and customs; even at Arnhem we have the evidence of a hearer¹ that a Dutchman, on being asked if he drank the Rhine water, answered: "I drink that water, and perhaps Germans have bathed in it? Pah! it makes my gorge rise."

Yet in Holland, as in other countries, there are two classes who look at all military preparations as a useless waste of money. These may be described as the "optimists," and the "pessimists," those who are prepared to accept

¹ M. Henri Havard, in his book, "*Les Frontières Menacées*."

whatever may come, and those who consider all resistance as hopeless. The feelings of both classes have their rise in indolence or in want of imagination.

There is yet a third class, and that the most dangerous, composed of those who would prefer the rest given by the rule of a Great Power, to the doubt and fear excited by the threatening aspect of the future. Given the opportunity these men may betray their country, and will certainly be among the first to recommend submission. The only two invasions of Holland which have been entirely successful, that of 1787 and that of 1794, were assisted materially by internal discord, for the Prussians were led into Holland by the Stadhouder, and the French by the Republicans. But the heart of Holland is in the main sound and her people, so tenacious of their land, their liberties, and their language will, when the time of trial comes, be faithful to the history of their nation and even Prussia, so powerful and so prodigal of blood and iron, may well hesitate to incur the cost at which the possession of Holland must be bought. But it must be acknowledged as almost certain that, except on the condition of foreign intervention, Holland must in time succumb to the numbers and resources of her neighbour. When the preparations of the Dutch are completed, they will have, so they consider, such defences as may be held for two years against almost any odds. Accepting this most favourable view, we may ask, "and after that?"

After that must come surrender, unless in the meantime some Power or Powers shall have, for selfish or other reasons, decided to stand by Holland and shall have successfully aided her in the struggle.

Of the Powers of Europe who will help her?

France is not ready for war; she seems, indeed, if all we hear be true, to be even less in a condition to fight than she was in 1870. She has more men, is true, but not so many soldiers, and the state of transition into which she entered after the German war appears to be still so feverish and chaotic, that there is at present no sign of any good end.

Austria, as Germany has no heart to fight Germans, as Magyar has no interest in the West. She has, in addition, been provided with employment in Bosnia sufficient to draw her attention eastwards. Again, "Italia" is still "irredenta," and the cry which is now stifled may, should it offer any promise or serve any purpose, be taken up from the Alps to Sicily.

Italy has enough to do to nurse her finances, is jealous of France, and is in the first stage of a fever, in whose delirium she may grow to believe that the Mediterranean must be an Italian lake. What is Holland to her, or she to Holland?

Germany, having Prussia at her head, is practically one with Prussia; and moreover, any conquest would probably be undertaken, and even held, in the name of Germany, though at the order and to the profit of Prussia.

Belgium, the nearest neighbour of Holland, has never been her friend, as weak as she is, could scarcely be expected to offer aid to a falling Power, especially when such an offer might serve as an excuse for her own destruction or absorption. In two cases only does it seem likely that Belgium would assist Holland against Prussia: first, if she knew, or believed that she knew, that any action of hers would be supported by France, at the risk, or perhaps with the object, of producing war between the latter and Germany; or secondly, if, there being no hope of help from France or any other Power, she realized that the conquest of Holland was but the first step towards her own annexation.¹ Yet, even in this latter case, she might be content to await the issue of events within the forts of Antwerp.

Omitting Spain as too remote and too unhealthy for effort; the Scandinavian Powers, who would scarcely move for fear of taking a false step; and

¹ It is reported that there is an understanding between Holland, Belgium, and Denmark, with regard to their mutual co-operation in defence.

Denmark, who is in process of extinction, there remain but Russia and England.

Russia, suffering from her anti-German rage, combined with her intense madness, may do anything, and it is impossible to foretell to what pitch extravagance her actions may not rise. One of two events seems, how probable: either she may undergo a war with Germany, followed by a reaction, or the revolution may come first and the war follow. But, except an excuse for such a war, it is not easy to see how the condition or conquest of Holland can in any way affect her.

England has the most to lose by the loss of Holland. She cannot afford (even from a pecuniary point of view) to have another rival for supremacy at sea, especially since that rival would possess harbours and arsenals within twelve hours' steam of her coasts. We have been friends, we have been enemies, with the Dutch, who do not love us for the share, of which Englishmen are ignorant, which we took in wresting Belgium from their hands. But, loving us or not, they would accept our aid, for some aid they must have in their need, or they must fall.

It will probably be acknowledged that the aim of Prussia in acquiring Holland will be to take through her a forward position as a maritime Power. It will also perhaps be allowed that we, who, until our recent success in Egypt, owed our chief prestige to our supremacy at sea, cannot endure the sudden growth of a new, an energetic, and a warlike rival, whose fleet manned by seamen who in a hundred fights have shown themselves the equals of our own, would be equipped in harbours adjacent to our coast within easy reach of the fair-way of our commerce, or would sail in foreign seas in numbers eventually as great as our own, to seize and occupy our lands, to which the superabundant population of the Fatherland might turn, and whence wealth might be drawn for the warlike Power which is ready for everything but gold.

The question, whether we should fight for the defence of Holland, is one which cannot now be answered, if only because it is impossible to say what circumstances England may be called upon to give her decision. Two things are certain: the first, that from a military and naval point of view it would be a grievous error (some may add disgrace) to remain quiet while Holland was engaged in almost hopeless strife, yet fighting our battle for her own; and the second, that, previous to late events, neither the Dutch nor Europe believed that we should move, even under the direst provocation.

The question of how Holland may best be aided by a foreign Power was considered later.

V.—THE GENERAL PLAN OF THE EXISTING AND PROPOSED DEFENCES OF HOLLAND.

As has been already mentioned, the kingdom of the Netherlands in 1830 divided into Holland and Belgium; each of these thus found itself compelled to rely only on her individual strength for defence against a power which had, even before the separation, been more powerful than their own force.

From that time commenced in each country an agitation for some system of defence, and in 1850 a Committee was appointed in Holland to examine the details of such a scheme. The result of the war of 1866 rendered this question even more necessary, and the excitement caused by that of 1870 obliged the production of a settled plan, the law establishing which was passed by the States-General on the 11th March, 1874. By this law it was laid down that the defences should consist of the following:—

- (a) The New Water-line of Holland,¹ which extends from the Zuider

¹ The province is meant.

- Utrecht to the Lek, from the latter to the Merwede, and then through the land of Altena to the New Merwede.
- (b) The position of the Gelder Valley, with that in the Lower Betuw ordinarily known as the Grebbe Line. (Map No. I.)
 - (c) The position on the Hollandsch Diep, and the Volkerak. (Map No. I.)
 - (d) The position of the mouth of the Maas and the Haringvliet. (Map No. IV.)
 - (e) The position of the Helder. (Map No. II.)
 - (f) The works on the Gelder Ijsel, Waal, and Maas. (Maps Nos. I, II and V.)
 - (g) The position of Amsterdam.
 - (h) The Southern Water-line, which extends from the Maas above Fort St. Andries to the Amer below Geertruidenberg.
 - (i) The works on the West Scheldt. (Not shown on map.)

These were by the project of the law to be completed in the following order :—

- 1st. (a), (e), and parts of (f) and (g).
- 2nd. (c) and (d).
- 3rd. (b) and the remainder of (f).
- 4th. Remainder of (g).
- 5th. (h).

6th. (i), of which it is proposed to omit further mention, as it is certain that the defences on the Scheldt will not be repaired and kept up.

The system was to be completed in eight years from the 1st January, 1877, at a total estimated cost of 2,500,000*l.*; of this sum, 1,041,600*l.* had been expended on the 31st December, 1879.

By this law all the old fortresses which were not already dismantled were ordered to be demolished, and the sites of their fortifications are now, for the most part, laid out as public gardens.

The scheme of defence is formed upon the following considerations. Holland is liable at any time to attack from an enemy whose strength immeasurably superior to her own, and it must therefore be impossible to guard the whole of her soil directly against an invasion. Rather she must be content to maintain a position in some previously chosen part of her land, with the intention, as soon as circumstances shall permit, of issuing from her line to regain possession of the territory before abandoned; or, if that be impossible, to prevent at any rate the quiet occupation by the enemy of his conquest, and to secure her own existence as a nation to the very last.

It would be impossible for the Dutch to fight on their borders, since their army is small, while their frontiers are long¹ out of all proportion to the extent of the country, and are moreover entirely artificial, and are provided with no natural obstacles or demarcations. Should such an attempt be made the army might be crushed at the commencement of the campaign, or might be cut off in its retreat on an interior defensive line.

It has therefore been determined to place the true line of resistance in the centre of the country, and to concentrate every effort at the points where the nature of the ground itself will give the greatest amount of aid. It has been already shown that the defence towards the east is far weaker than towards the south, and if further proof be needed, we have only to examine the course of previous invasions. Of the eight attacks which have been made on Holland during the last three centuries, six have been directed on the eastern frontier and two only on the southern, while of the latter, that of 1793 failed almost before it had begun, and that of 1794 was successful on account of the peculiar hardness of the winter, which rendered the inundations useless, and o-

¹ Especially the sea coast.

having found its advance facilitated and even guided by men who were more republican than patriotic.

Again, the signs of the times, and Dutch opinion, point to the eastern frontier as that on which danger threatens, and we shall therefore find that the principal efforts of the nation have been directed against an advance from that point.

The two provinces of North and South Holland have been selected as the seat of concentrated defence, and they will be covered towards the east by the New Water-line, on the south by the various coast fortifications which close the mouths of the rivers, and on the north by Amsterdam, which also forms a *rédut*, or last retreat.

These two provinces have been selected on various grounds. They contain the capital of the kingdom, the seat of government, the three most important commercial towns, and almost all the main harbours, and are moreover the richest and most populous of all the provinces of Holland. But all these reasons had probably less weight in the choice than the fact that of all the country this is the lowest, the wettest, and the most highly cultivated portion. It is thus by far the easiest to defend, for not only is it enclosed on three sides by the sea or by large rivers, but on the fourth side the nature of the country permits the formation of a very wide line of inundations. The ground itself also almost entirely consists of polders and drained lakes, which may be flooded one after another and be defended foot by foot. It is further exceedingly rich in supplies, both of corn and cattle, whereas the east of Holland is poor and sterile.

The commercial and political value of Amsterdam would necessitate its choice for the site of the last national fortress, even if it were not the only part of the country around it is of all Holland the lowest and the most intersected.

To sum up, (a) the New Water-line is the main line of defence, to this Amsterdam forms, as it were, a citadel, while the other defences serve on a subsidiary purpose, and are employed each for some local object.

The Southern Water-line (b) was intended to resist an attack from the south, but so little dread have the Dutch at present of such an invasion, this line has been almost entirely neglected, except with regard to those fortifications of it which close the navigation of the Waal and Maas, or cover the southern flank of the New Water-line.

The approaches to the latter from the sea are closed by (c) the post at Willemstad, (d) that at Hellevoetsluis, while (e) that of the Held is intended to prevent the passage of a hostile fleet into the Zuider Zee, or to hinder the landing of an enemy to the north of Amsterdam.

There remain only (f) the Grebbe line, and (g) the lines of the Gelder and the Waal: these are intended as advanced posts which shall delay the enemy's movements and shall thus give time for the formation of the main defences on the New Water-line; and are further to be employed to protect the retreat of any troops which may have been pushed forward to observe and hinder the march of the invader.

For the Dutch do not propose, at the first declaration or act of war, to withdraw into their defences as a snail into his shell; on the contrary, they intend that no province shall be abandoned until the retreat of the army becomes a necessity, since by so doing the resources and possibly the military services of its inhabitants would be lost, for they might prefer in such a case to remain at home, in order, if possible, to secure their property from pillage.

The present system of defence arranges for the occupation of bridge-heads, &c., on the line of the Gelder Ijsel, beyond which, if necessary, the main and advanced bodies of infantry will be employed until driven in by the enemy.

When the line of the Ijsel has been forced or turned, the field army will fall back on the Grebbe line, and thence, when pressed by superior force,

the New Water-line, avoiding everywhere any serious action, but at the same time using their utmost endeavours to retard the advance of the enemy, and thus to gain time for the completion of the inundations. The character and defects of the IJssel and Grebbe lines will be hereafter considered in detail, and it has been thought sufficient to give here the reasons for their existence.

It is also considered that some such advanced line is necessary, in case that Holland, though not suffering invasion, be called upon to make her neutrality respected in the event of a war between neighbouring States. It is held that with this object it would not be sufficient to take up a purely defensive position in the centre of the country, but that the army must, by the nature of the case, be advanced to the frontiers, in order to resist any violation of the territory. In either event few defences would be required, and thus we find that most of the old forts have been or are to be dismantled.

The *Revue Militaire*¹ states that the Minister of War has lately presented to the States-General of Holland a law which very much modifies that of 1874. It is found that the necessary fortifications cannot be completed by the date at first given (1st January, 1883), and a further period of six years is demanded, making a total of fourteen years, ending 1st January, 1889.

Without going into details, which will find their proper place under the next heading, it may be mentioned that under this law the defence is to take a yet more concentrated form, since all works not directly of use to the New Water-line are to be condemned. Thus it is proposed to give up a great part of the Southern Water-line, and also the forts on the West Scheldt, a proceeding which, it is stated, will result in a saving of about 600,000*l.*, part of which is to be expended on the construction of defences at the railway bridge, which at Moerdijk crosses the Hollandsch Diep.

It is hoped that what has been written above has made sufficiently clear the general character and object of the present system of defence of the Dutch; but, before proceeding to examine the actual details of each position, a short space must be given to the description of the design and mode of execution of the proposed military inundations, and also of the usual type of fort employed in Holland.

(I.) The Netherlands, as its name implies, and as every child knows, is a country so low and flat that the traveller on first entering the country wonders how sufficient fall can be obtained to allow of that drainage of water to which the land owes its existence, and indeed it is only by extreme skill, and by making the most careful use of even the smallest difference of level, that the rivers can be persuaded to run into the sea, which at many places is at flood tide above the mean level of their course.

Holland has thus no rising ground² such as would generally be chosen for a defensive position, but the disadvantage which she labours under as regards the command of ground by the fire of the defence is more than made up to her by the fact that owing to the nature of her soil, and to her power of inundating the land at will, the front of attack may in almost every case be limited to the width of a road or dyke along which *only* the enemy can advance.

By careful levelling it may be discovered in time of peace which roads, &c., will remain above water, and the forts may be so arranged as entirely to bar all means of access. Nor is this power of as it were ordering the assumption of a particular line of attack, and at the same time limiting its front to a minimum, the only advantage offered to the defence by the use of water as an obstacle; for it is evident that the existence of the flooded land will oblige the defender to make all his approaches and batteries on the dykes, and thus, on account of their small width,³ he can only do at the cost of sacrificing the use of them as roads. It is true, however, that, if the invader can succeed in

¹ 1st April, 1882.

² Except in the east of the country, *e.g.*, around Arnhem.

³ Seldom, except the sea-dykes, of greater width than 12 feet at the top.

any way in making the inundation passable, then in many cases the dy will serve as traverses to protect his advance from the fire of the forts, while at all times they screen his movements, and conceal the efforts that he makes to remedy or nullify the inundations.

All ground can be flooded which lies lower than the water-courses around about it, but it is not found in practice to be either necessary or desirable to take full advantage of this power. Polders and lakes which have been artificially drained can be easily flooded by merely stopping the mills (wind or steam) which daily pump the water from them; but this process is slow, and in the case of very hot and dry weather, may fail entirely. In that event water may be let in either through sluices previously prepared, or in emergency by piercing the dyke. The latter course is, however, if possible, to be avoided, as by so doing all command over the water is lost, and no plan can be set to the inundation. Again, all ground can be inundated while lying along the side of a river, is ordinarily protected from floods by river-dykes, provided of course that at the time the level of the land is below that of the water. Indeed in most cases the formation of inundations would imply merely the restoration of the land to the condition from which it has been reclaimed; but there always exist certain localities in every inundation and in every line, of which the difference of level, though very slight, renders it difficult or impossible to cover them with water; again, as we shall see later, it is in many cases necessary to bring water from a distance by special canals, for the purpose of flooding districts which are higher or but slightly lower than the adjacent water.

The sources from which water may be drawn to form inundations are—

- (a) The large rivers.
- (b) The small rivers.
- (c) The sea.
- (d) Rain and the springs.

(a) The large rivers, such as the Rhine, the Waal, the Maas, and the others, though they vary constantly in height, yet always supply a large quantity of water, and are therefore more to be counted on as a source than are the small rivers.

(b) The small rivers, many of which are fed altogether by the rain-fall, may thus at times be dry.

(c) The sea has two great advantages as a source of water: it is inexhaustible, and it is always approximately at the same level, but its use entails depreciation in the productive power of arable land, especially if the land has a clay soil.

(d) Rain and spring water are only available under certain circumstances when the supply is so abundant that it exceeds the natural evaporation.

Many of the localities selected for flooding can be inundated with water from more than one of the above sources, and indeed it is often necessary to provide means for drawing off the surplus water.

The object aimed at in forming a military inundation is that it shall be deep as not to be fordable, and so shallow that it is not navigable, but the actual depth and amount of water required depends very much upon the character of the soil.

If this be of clay, or marshy, it is sufficient just to cover the surface with water, as it then becomes so slippery and soft, that it is practically impassable by troops. The same may be said in the case where the ground is intersected with ditches and water-courses, since these, when hidden from view by the overlying water, form impracticable obstacles. Firm sand, however, is not cut up by ditches, is the most unfavourable ground, as it may always be passed, unless inundated to a great depth, in which case it becomes navigable.

The Dutch have selected a depth of from 6 to 20 inches, as that

best answers all requirements: a greater depth than the latter would also tend to make the inundation larger than necessary, which implies an enormous increase over the amount of water estimated to be required.

For this reason, and on the ground of the unlikelihood of the supply being equal to the demand, the Dutch hold that broad inundations will, as a rule, be easier to pass than narrow, but they lay down no absolute rule on the subject, recommending only that when possible the breadth should be sufficient to prevent the guns of the assailant from commanding the defender's edge.

Even in Holland, to the eye so flat and level, the ground in the course of some miles has necessarily a fall in some direction, and, seeing how small a margin is allowed by the variety in depth given above, it is obvious that in order to ensure approximately the same depth along a line of 20 or 30 miles, it is necessary to divide that line into several basins, each with its own level. This is done by means of some of the existing dykes, or by special dykes¹ constructed for the purpose, which bound the various fractions, each with a different inundation level to the other, but with the same throughout the extent of each basin. There are two difficulties with regard to these dykes; firstly, as they form approaches along which the enemy can cross the inundation they must be defended; and secondly, if the level of two basins vary very considerably, there is a certain risk that the enemy may, by piercing the intervening dyke, run off the water from one into the other, and thus make one fordable and the other navigable.

The dykes which exist between the polders, &c., and which are not needed as "Komkeeringen," must be pierced, so as to allow the water to spread over the whole basin.

The quantity of water required for an inundation depends naturally upon the extent of ground to be flooded, and the depth of water required, but two other considerations affect it considerably, namely, the time of year and the nature of the soil: the time of year, because in a dry season the ground will absorb more of the inundation water than it can when saturated with rain and the soil, because the ground must be saturated before the water will commence to rise, and sandy ground will thus require far more to flood than will a clay or marshy soil. In order, therefore, to calculate the amount of water required for a given inundation, it is necessary not only to multiply together the length, breadth, and depth, but the product also must be multiplied by a certain co-efficient in order to allow for the water which sinks into the ground. In clay or marshy ground this co-efficient will be about .05 to .1, while in sand it may rise as high as 3. Assuming that 1,000,000 cubic yards be the volume of the inundation; then the amount of water required will be for clay or marsh land $1,000,000 + 100,000 = 1,100,000$ cubic yards, and for sandy soil $1,000,000 + 3,000,000 = 4,000,000$. The data required for calculating the time necessary for the formation of an inundation are: the amount of water needed, the number and width of the sluices, &c., by which the water can flow in, and the difference of level between the locality to be inundated, and the source whence the water is supplied, or, to be more correct, the difference of level between the water at the source and the water in the basin.

Thus favourable conditions for an inundation as regards rapidity of completion are—

1. Small area and depth.
2. Clay or marshy soil.
3. Wet weather.
4. Large sluices.
5. A great difference in the water-level.

¹ Komkeeringen.

The latter may be assisted by spreading the inundation water, as it pours in, over as large an area as possible, and for this purpose steam pumps may be employed.

The advantages of inundations to the defender have been already mentioned; one great disadvantage attends their use, namely, that they render it impossible for him to assume the offensive, since the assailant has then a decided advantage on his side. Another failing of such a system of defence is that it cannot at all times be ready, nor can it be certainly relied upon, since owing to the enormous loss occasioned by its use, the flooding of the land is certain to be delayed as long as possible, and may easily be delayed too long. If the inundation has not been formed before the arrival of the invader, the latter may be able to prevent its completion unless care has been taken to select as sources of water points behind the inundations,¹ and to protect them with fortifications.

The assailant may endeavour to make the inundations passable in one of two ways: he may let in water in order to render them navigable, or he may let out water with the view of fording them. To counteract such efforts the defenders should have it in their power to add or to draw off water when necessary, and under any circumstances such power is needed to enable them to counteract the effects of heavy rain or excessive evaporation.

Inundations may also be rendered passable, and therefore useless, by a severe frost, and many plans have been suggested to overcome this defect, which, however, appears to be almost insurmountable.

It has been proposed to run off some of the water after one or two days of frost, and thus to leave only a weak coating of ice, while the air beneath might serve to prevent the freezing of the lower stratum of water. In practice it is found that the length of time necessary to draw off the water renders this plan of little use.

Another plan suggested is to keep the water in continual motion, by letting it off on one side and in on the other, but since even the large rivers of Holland are often frozen, it is obvious that, in order to prevent the formation of ice, the stream must be very powerful, while the nature of the inundation renders impossible the production of a swift stream; at best this plan is available only with regard to canals and small streams. Again, the ice may be broken by alternately raising and lowering the water-level, but this is not easy, if only on account of the amount of time required for the operations.

Ice may be broken up by explosives, or by manual labour, or by special built steamers; in any case care must be taken to draw the broken pieces from the water, or they will be quickly re-frozen into a solid mass. With regard to the use of explosives, it has been found by experiment that the effect of their use, great as it is locally, extends over but a small area.

Inundations made with salt water are of course little liable to freeze, from a financial point of view they are disastrous, especially on clay or arable land, which is by their use so injured, that it requires many years of careful culture to bring it round.

On sandy or pasture land the effect is not so bad, and there are even certain places where the land is intentionally flooded every year for a short time with sea-water; but the loss to the country by the use of salt or fresh water inundations will vary very much, as to its amount, according to the time of year at which they are formed.

(II.) As might be expected, the forts in Holland, built as they have been under similar conditions, and to serve identical ends, have considerable resemblance to each other, though no two are exactly alike. As regards trace, they may be roughly classed under four heads, namely:

(a) The small forts, old pattern.

¹ This is not always possible.

(b) The small forts, new pattern.

(c) The medium and large forts, old pattern.

(d) Do. do. new pattern.

(a) These forts, which are intended to defend only a single approach, and that probably not of great importance, are as a rule of but little value against modern artillery, since they consist of a brick or masonry keep, resembling large Martello tower, surrounded, but not in the least covered, by a parapet either circular or polygonal, which again is encircled by a wet ditch. But these there are but few, as no great expense is necessitated by the construction of

(b) These are small redoubts, intended for the same purpose as the above and consisting of an earthen parapet without revetment, surrounded by a wet ditch which has no flank defence. They have little strength save such as afforded by their position, which is, however, as a rule, very favourable to defence, since they stand on the only dry ground in the vicinity, and completely command the very narrow dykes by which they may be approached. Of such fortifications as these there is a great number, for in some parts of the country every line of access is covered by one.

(c) The forts of this pattern are polygons of 4, 5, or 6 sides, each of which is defended by some modification of the bastioned trace. The sides appear to be often too short to allow of good flank defence, and the bastions are often dangerously small. The guns as a rule fire either through shallow embrasures or over the parapet, in which latter case they are divided by traverses and *bonnettes*. The centre of the front parapet is very frequently so raised as to form a cavalier battery, while bomb-proof barracks are built under a large and high traverse which extends almost across the fort. The rear face generally of slighter profile, and in some cases the gorge is closed by a loopholed wall. The keep or *réduit* is built of brick, has generally a small parapet on the top, is frequently of very great height, and is in many cases covered by a high counter-guard, from which it is separated by a wet ditch which surrounds the whole circuit of the *réduit*. The ditch of the fort almost invariably wet, and is always of very considerable width. Neither the escarp nor the counterscarp are as a rule revetted, though to this there are exceptions; the road which the fort is intended to guard usually runs along the counterscarp, though in some cases it leads directly through the fort.

(d) The new pattern forts are, as regards their trace, a combination of the bastioned with the polygonal system, their ditches being, as a rule, flanked by caponiers, while their sides are indented on a principle which has much in common with the bastioned trace. Their internal details resemble in general plan those of the class (c), but the traverses are higher and thicker, and the keeps and cavalier batteries have even more command, while their bomb-proof accommodation is far more complete.

Few of the forts have any covered way, glacis, or indeed any works beyond the ditch. As might be expected, the larger and more complete forts are used to cover the ground in front of Utrecht, which cannot, on account of its level, be secured by complete inundations.

Owing to the nature of the country, since water is almost everywhere within a few feet, or even inches, of the surface of the soil, no cover for magazines, &c., can be given by excavation; for this reason, as also because the Dutch seek by raising some portion of the parapet to obtain a considerable command over the surrounding country, the forts strike the observer as presenting an unusually good mark for the assailant's fire. Another defect common to many of them is caused by the fact that the ground around them is overgrown up to the counterscarp with copses, woods, orchards, &c., while trees of a very small height are in this singularly level country capable of shutting out the entire view. The enemy, it would appear, could always

the keep, while, unless much wood be cut down, he would himself be invisible from the parapet.

Few of the forts visited had their guns mounted, though in many cases they were on skids on the ramparts; the guns seen were small, apparently about 16 or 20 pounders, and were by no means all breech-loaders.

VI.—THE DETAILS OF THE VARIOUS DEFENCES AND INUNDATIONS.¹

The New Water-line of Holland, being the principal line of defence, claims to be first considered; this extends from Muiden and Naarden on the Zuider Zee, by Utrecht to Vreeswijk on the Lek, thence along the Diefdijk to Asperen, from which it runs by the Linge to Gorinchem on the Merwede, to the south of which it passes through the land of Altena to the New Merwede. It has a total length of about 40 miles, from the Zuider Zee, which covers the left flank, to the Hollandsch Diep, on which the right rests, and it is defended along nearly the entire front by a chain of inundations. The soil is almost universally favourable to the latter, being clay, while the country consists of polder land, divided by few dykes, but intersected in all directions by numberless ditches: from this it results that the minimum of water will be required, since the ground is not absorbent, and the inundations need not be deep.

The ground on the east of the line, which will be in the occupation of the invaders, is from the south as far as the Lek low and wet; above the Lek it is higher, and on the east and north-east of Utrecht is sandy, and therefore comparatively dry; the inundations from Utrecht to the Zuider Zee are bounded on the east by higher ground, which will prevent any possibility of the water being drawn off by the enemy. To the west of the line the ground falls, thus giving the defenders great power over the water of the inundations, which, being retained by dykes, may be regulated by sluices.

The northern part of the water-line forms practically part of the position of Amsterdam, with which it is connected by Fort Nieuwersluis.

It will be convenient to divide the water-line into four parts, which will be considered in turn, viz.:

1. Between the Zuider Zee and the Lek.
2. Between the Lek and the Waal.
3. Between the Waal and the Maas.
4. To the south of the Merwede.

1. *The part between the Zuider Zee and the Lek.*

Inundations.—Since the ground between the Lek and Muiden falls 3 or 4 yards, it is necessary to divide the inundations in the interval into four basins.

1st Basin. This is bounded on the north by the Zuider Zee, on the west by the Vecht, on the east by rising ground, while to the south it extends as far as Forts Gagel and Ruigenhoek, and is, for purposes of inundation, further divided into two parts by the dyke which runs north-east from Fort Tienhoven.

Of these parts the more northerly is flooded with sea-water, obtained by opening a sluice at Muiden, where the sea has a mean level of 10" above the river Vecht: the sea-water would thus run up the river, and would be admitted over the land by opening the sluices in the right dyke of the latter. The ground to the south of Naarden is very much intersected with ditches, and is at all times in many places covered with large sheets of water.

¹ It is impossible, without unduly lengthening this paper, to give every detail of the formation of the inundations, or to do more than offer a general idea of this most complicated subject.

The southern portion of the 1st basin will be inundated with water from the Lek through the Vaartsche Rhine and the Vecht, which last will be dammed at Nieuwersluis, while the sluices in its right dyke will be opened. The difference of water-level between these parts will be about 19", the former having a level of $A - 7.8''$, the latter of $A + 11.8''$.

Little loss would be suffered by the use of sea-water in the northern part since the country is there peculiarly barren, while the advantage gained by the use of two sources is invaluable as regards the saving of time.

2nd Basin. This extends to the south-east as far as the road which runs through Fort Blauwkapel. It is inundated from the Lek, through the Kromme Rhine, into which water is admitted through a special inundation sluice at Wijk-bij-Duurstede, and is allowed to flow over the land by opening sluices in the various waterways near Utrecht. The level of flood of this basin is $A + 23.6''$.

3rd Basin. This is a very small triangle to the north-east of Fort Blauwkapel; it is flooded by the same means as those used for the 2nd basin, and has an inundation-level of $A + 51''$.

4th Basin. This is divided into two parts by the Kromme Rhine and the higher ground near it, but each part has the same level of inundation, namely $A + 61''$.

The northern portion is by far the smaller, and includes only the inundation to the east of Utrecht, while the southern extends along the Vaartsche Rhine to Vreeswijk on the Lek.

Part of the ground in front of the Lunettes at Utrecht, shown in the map flooded, is left dry; as is also a strip along the north side of the Lek, varying in width from 650 yards on the east to about 200 yards, but the water reaches the dyke of the Lek at two points, one in front of Vreeswijk, the other about half-way between that fort and Honswijk.

The water for the northern part of this basin is obtained in the same manner as that for the 2nd and 3rd basins; that for the southern from the Lek by a sluice near Honswijk by means of a special inundation canal; but each can be inundated from either source. If the Lek be low, all inundation depending upon it for water must necessarily fail either in completeness, in rapidity of formation, and to obviate this defect, it has been proposed to construct an inundation reservoir on the Lek at Vreeswijk; but it appears that such a plan cannot be carried out until the actual declaration of war, owing to a convention made in 1868, at Mannheim, between the States which lie along the Rhine, to the effect that no works should be constructed by any one of them which might tend in any way to impede the river traffic. It has therefore now been resolved to dam the Holland IJssel below Gouda, and draw the superfluous water thence by pumps, &c., and so to supply the need.

With regard to the time required to complete the inundations between the Zuider Zee and the Lek, it is given that, supposing that all canals, ditch &c., are already full, it will—

If the level at Honswijk be $A + 65''$ require 12 to 13 days.²

” ” $A + 86''$ ” 6 ” 7 ”

” ” $A + 106''$ ” 4 ” 5 ”

Fortifications.—*Muiden*, a fortress at the mouth of the Vecht, which covers the approaches from Naarden, whether by road or canal. It has a bastion trace with wet ditches, and possesses some bomb-proof accommodation. The mouth of the river is defended by the West Battery, which stands on the left bank. The garrison of Muiden would be from 800 to 1,000 men.

¹ All water-levels in Holland are referred to the mean level of the IJ at Amsterdam; this is called the Amsterdam “peil” or level.

² Of 24 hours.

Naarden, 8,200 yards from *Muiden*, is a bastioned fortress, with wet ditch, bomb-proofs, and some outworks. The escarp is revetted. It covers *v* roads, and also the railway from *Amersfoort*. The *Ronduit*, which covers space between *Naarden* and the sea, is an earthwork with a wet ditch provided with bomb-proofs, and is connected with *Naarden* by a covered Garrison of *Naarden*, about 1,000 men.

In front of *Naarden* stand—

On the east, three lunettes¹ of no great importance,² and further comm by higher ground to the eastward.

On the south, two batteries on the *Karnemelk* ditch, a battery on *Koedijk*, and two batteries in front of *Bussum*. All these are earthworks, and, except the two last, have all wet ditches. They are intended to secure outworks to *Naarden*, and to fill the space between the lunettes and inundation.

Weesp, 2,700 yards south of *Muiden*, is on the left bank of the *Vecht* three bastioned fronts which cover the town towards the east. The ditch is wet, and there is a defensible bomb-proof barrack. It covers the sluice which water is drawn from the *Vecht* to make the inundations at *Amsterdam*, and guards also the railway, canals, &c. Its garrison is 200 men.

It is evident that a great change will take place, as regards the object and value of these fortresses, when the proposed scheme to drain the whole of the *Zuider Zee* has been carried out; but it is at present impossible to judge of their future condition, since we have no data as to the character of the undertaking.

Fort Uitermeer,³ about 2 miles to the east of *Weesp*, is an earthwork of irregular bastioned trace, standing on the right bank of the *Vecht*. It has a wet ditch and bomb-proof accommodation, and is intended to defend the railway and the roads which pass near it.

Fort Hinderdam, which lies 1,600 yards south of *Fort Uitermeer*, is situated on an island on the *Vecht*. It is a small earthwork, with a ditch and a bomb-proof guardhouse. It was built to cover the sluices which were at one time at this point, but has now no particular object, since the only road near it would almost certainly be covered by the inundation.

The dykes and roads further to the south are guarded by *Fort Kijkuit* and *Fort Spion*,⁴ which are both small square earthen redoubts with wet ditches and bomb-proofs. These forts serve also to prevent the passage of the inundation should they become navigable, by means of boats or rafts. *Kijkuit* is 1,000 yards from *Hinderdam*, and the same distance from *Spion*.

Fort Tienhoven, a similar redoubt, lies on the dyke which separates the parts of the first basin of the inundation, and serves to guard it and the town on it. *Tienhoven* is 4,500 yards from *Spion*, and 2,700 from *Fort Maarssen*, which is not yet completed;⁵ it will be an oval fort, of which the longer faces east; it also has a wet ditch.

In rear of the outer line formed by the last three forts, stands *Nieuwersluis*,⁶ on the *Vecht*. This is a large and important fort, and is undergoing great improvement. The principal defences are on the left of the river, and consist of a wet ditch and an earthen parapet of an irregular shape with a very high cavalier. It contains also sufficient bomb-proof

¹ The so-called "offensive of *Naarden*," but of late the name, as well as the intention of offensive operations from this quarter, has been abandoned.

² The centre lunette has its gorge closed by a loopholed wall; the other two are open.

³ No. 10 plate of forts.

⁴ Nos. 8 and 9 plate of forts.

⁵ It is to be finished this year.

⁶ No. 6 plate of forts.

for its garrison. It covers the sluices in the Vecht which serve to inundate the country about Amsterdam, guards the road from Utrecht to the capital, and also the Rhine railway, and closes the dykes along the Vecht. This fort forms the south-east pivot of the defence of Amsterdam, and is the connecting link between it and the water-line.

The next portion of the line, that between Fort de Klop and Fort Jutfaas, forms the position of Utrecht; the ground being here less easily inundated, is therefore less defensible, and, in consequence, the forts are not only larger, but also nearer together.

Utrecht is an important junction of roads and railroads, and is further from the same cause that weakens its defence, the point in the line most suited to the assumption of the offensive. Of the forts composing the position, the following were built before 1840, namely: de Klop, de Gagel, Blaauwkapel, de Bilt, and Vossegat, and the four lunettes to the south-east of the city; these are, except the two first, only 1,000 to 2,200 yards from Utrecht. Between 1867 and 1869 were built Forts Ruigenhoek, Voordorp, Rijnauwen, and Vechten, of which the second is 2,700, the others from 3,800 to 4,400 yards from the city; during the last few years the forts on the Hoofddijk and Hemeltje have been added to these.

*Fort de Klop*¹ is a moderate sized redoubt, with a wet ditch and bomb-proof. It is about 3,300 yards north of Utrecht, and guards the dyke upon which it stands, as does also *Fort Gagel*,² which is situated 1,500 yards in front of de Klop. The latter is a lunette with a wet ditch, but the gorge is open.

About 3,000 yards from Fort Gagel is *Fort Blaauwkapel*,³ a large square bastioned fort, with wet ditches, and having an isolated brick *rédut*. It serves to defend the road which passes through it, and also two lines of railway.

*Fort Ruigenhoek*⁴ stands to the left front of Blaauwkapel, in the centre of a perfectly open meadow. It is a four-sided bastioned fort, with a wet ditch and bomb-proofs. It serves to defend the front of Blaauwkapel and de Gagel, and to close the dyke on which it is situated.

Fort de Bilt,⁵ 2,200 yards from Blaauwkapel, stands very near to the city on the road leading to the village from which it takes its name. It is a large bastioned fort, with a high cavalier battery, bomb-proof barracks, and a brick *rédut*. The ditch is wet, and the road runs along the counterscarp. The fort serves also to guard an inundation sluice which lies close behind it.

*Fort Voordorp*⁶ lies in advance of and between Forts Blaauwkapel and de Bilt. In general arrangement it resembles Fort Ruigenhoek, and serves to defend the dyke on which it stands, and the fronts of the two neighbouring forts. It is armed with 28 guns and 4 mortars.

*Fort Vossegat*⁷ is situated 1,300 yards from Fort de Bilt. It consists of two bastioned faces and a gorge parapet, with a wet ditch and a *rédut* containing bomb-proof barracks. It lies on the north bank of the Kromme Rhine, and serves to assist in the defence of the ground which cannot be inundated.

The battery on the Hoofddijk,⁸ to the north-east of Vossegat, has been lately completed. It is a lunette with an obtuse salient; it has a wet ditch but the gorge is open. It is about 1,500 yards from de Bilt and from Fort Rijnauwen,⁹ a very large but irregular fort, with a wet ditch flanked by caponiers, which defends the dry ground, and covers the Arnhem railway. It has a brick keep surrounded by a wet ditch, and capable of independent defence. Its garrison numbers 1,000 men, and it is armed with 123 guns and 18 mortars.

¹ No. 20 plate of forts.

² No. 22 plate of forts.

³ No. 4 plate of forts.

⁴ No. 13 plate of forts.

⁵ No. 11 plate of forts.

⁶ No. 17 plate of forts.

⁷ No. 14 plate of forts.

⁸ No. 12 plate of forts.

⁹ No. 1 plate of forts.

Fort Vechten,¹ 1,500 yards distant from Rijnauwen, is situated on the bank of the Kromme Rhine, and guards the open ground, the railway from Arnhem, and the road from Wijk-bij-Duurstede. It had at first a bastion trace, but the parapet has now been indented, in order to allow of the fire of a greater number of guns. It has a brick keep similar to that of Rijnauwen and has about 2,200 yards of clear range, while the fire of the latter is hampered by the woods which lie close in front of it. Its garrison numbered about 900, and it is armed with 102 guns. The two latter forts are intended to cover the advance and protect the retreat of any offensive movement from the position.

Coming nearer to Utrecht, we find a line of four lunettes posted to cover approach to the city by road or rail. These works have revetted escarpment and a loopholed wall at the gorge. They are of considerable size, and of some strength, but are so close to Utrecht that they could scarcely be defended. Since their wet ditches must be crossed by bridges, they tend to make an offensive movement more difficult by narrowing the exit.

There is also around Utrecht, in rear of the forts, a covered road with parapet and barbettes for field guns. It starts from near Fort Vossegat, runs by Bilt to Blauwkapel. It is so near to Utrecht that it can be of little use, and though covered by a wet ditch the profile is too weak to permit of real defence.

About 3 miles from Utrecht, and on the east bank of the Vaart Rhine, stands *Fort Jutfaas*,² a fort of considerable size, on a modified bastion trace; it has a wet ditch and bomb-proof barracks, and is to be armed with twelve guns of 12 c.m. and four 29 c.m. mortars. It is intended to cover a gap which here exists in the inundations, and is assisted in this task by advanced batteries, which have each bomb-proof barracks and magazines, of which the garrison is about 200 men. Fort Jutfaas is about 3 miles from Vechten, and as this distance is too great for mutual assistance, a fort, *Heemeltje*,³ has been begun between the two. It does not appear to be yet completed, but will have an obtuse salient, two flanks, and a parapet; the ditch is wet, and is defended by caponiers. To the south of Jutfaas the next approach is formed by the ground along the north dyke of the Lek, which lies too high to allow of inundation, and also, when the water is low, by the alluvial ground between it and the dyke. This line therefore requires a strong defence, more especially as in it lie the sluices at Honswijk and Vreeswijk.

Fort Honswijk,⁴ a modified bastioned fort, with wet ditches and a bomb-proof barrack, stands on the dyke of the Lek. It is assisted in defence by a lunette at a little distance, and by a battery still further to the rear, each having a garrison of 120 men. The latter has a bomb-proof barrack, and the three works are connected by a covered way which runs along the inundation canal. Another battery, also provided with bomb-proof barracks, lies on the Lek dyke, about 3,500 yards behind Honswijk, while at Vreeswijk is a small irregular redoubt with a wet ditch, which is intended to guard the sluice at that point.

It is impossible to pass from the consideration of this section without remarking upon the obvious danger which arises to the defenders from the very advanced position of Wijk-bij-Duurstede, where lie the sluices which of the greatest importance for the formation of the inundations. That position is entirely undefended, and, indeed, is so far in advance of the main line of defence that it is difficult to imagine how any defence may be possible; so that an

¹ No. 2 plate of forts.

² No. 15 plate of forts.

³ No. 24 plate of forts.

⁴ Garrison: 2 companies infantry, 1 company artillery, and armed with 93 No. 5 plate of forts.

prising enemy may, by two forced marches,¹ possess himself of the principal source from which the water for the flooding of the Utrecht line is drawn, and may thus seriously delay, if he does not altogether prevent, the success of the inundations, upon the sufficiency of which hangs the whole scheme of defence. It is also worthy of remark that the besieger's position in front of the Utrecht line is far higher and more healthy than that of the defender's.

2. *The Section between the Lek and the Waal.*

Inundations.—The country to be flooded is bounded on the west by the Diefdijk as far as Asperen, at which point the inner edge turns to the west, as far as the Zederick Canal, parallel to which it runs southwards to Gorinchem; the eastern boundary may be seen on the map, but the scale of the latter is too small to make it possible to describe its course in detail.

This section is divided into three basins, viz. :—

- (a) Between the Lek and the north dyke of the Linge.
- (b) Between the north and south dykes of the Linge.
- (c) Between the latter and the Waal.

(a) The first basin has an inundation level of $A + 61''$, and a breadth from east to west of about 7,600 yards. The water required to flood it is drawn from the Lek through the ditch of Fort Everdingen, and through a sluice near Fort Spoel, and is distributed by special canals over the basin. If the water supply of the Lek is insufficient, the inundation may be formed by means of a sluice in the north dyke of the Linge. The sluices at Fort Everdingen, three in number, are each 70'' wide, and that at Spoel has a width of $8\frac{1}{2}$ yards.

(b) The second basin, since it consists only of the land between the river dykes, is of only small breadth. It is inundated by damming up the Linge by shutting the sluices which lie near Asperen, and, if necessary, the supply of water may be increased from the Waal by means of a sluice below Tiel, through an inundation canal.² The level of this basin when flooded must be at least the same as that of (a), and would generally be higher, since it may have a supply of water both to the latter and to (c). The main level of the Waal at Tiel is $A + 17$ feet, and is therefore about 12 feet higher than the inundation level of this basin.

(c) The third basin has an inundation level of $A + 39''$, and even then a width of from 550 to 650 yards is left dry along the northern dyke of the Waal; but the water on the northern edge will probably extend up to the southern dyke of the Linge. The water required may be taken from the second basin when filled from the Waal, or it may be drawn directly from the latter river by means of a sluice near Dalem, a steam pump and sluice near Vuren, and another sluice at the same place. The first has three openings, each 18 feet wide, and the second has a width of 12 feet, while the level of the third is so high that it is of but little use. The average level of the river Dalem is $21''$, and at Vuren $36''$ above the inundation level, so that it is generally easy to flood this basin, but in times of great drought it may be necessary to use the canal from Tiel to the Linge, mentioned above. With regard to the time required to flood this section, it is now considered certain, owing to the late improvements, that the inundations could be always prepared in time to meet an attack.

Fortifications.—The first approach to be guarded is that formed by the IJssel and its southern dyke; this is covered by two forts, Everdingen and Spoel.

¹ Wijk-bij-Duurstede is 30 miles, as the crow flies, from the nearest point of frontier.

This canal is not open, though it is completed with the exception of the cutting through the dykes of the Waal and the Linge. Its bottom breadth is 35 feet.

which, however, lose much of their defensive value by the existence of embankment of the railway near Culenburg,¹ which is distant 2,600 y from the former, and 1,500 yards from the latter fort. To obviate this advantage, as also to guard the railway bridge across the Lek, it frequently been proposed to erect a fort at Culenburg, but as yet nothing been done.

Fort Everdingen stands on the point of junction of the Lek dyke and the dyke, and is an irregular earthen redoubt, with a wet ditch and a bomb-proof réduit. It might from its position, 1,800 yards in advance of Honswijk, to extent guard the approach to the latter, were it not that the northern Lek acting as a traverse, completely shields an enemy, who may advance along northern side. To the south of Everdingen are three emplacements, each three guns, of which the most distant is about 760 yards from the fort.

Fort Spoel is intended to cover the sluice which lies in front of it, consists of a small earthwork, of which only the northern half appears provided with a wet ditch, but the inundation would no doubt cover ground as far as the counterscarp of the southern portion.

About 11,000 yards to the south of Everdingen lie the important approach offered by the proposed railway from Dordrecht to Nijmegen, and by river Linge and its dykes.

To guard the former an earthen battery is proposed, if not made, on the dyke, at the point where it is crossed by the railway; it will serve also defend some ground in its front which cannot be inundated, and to do with its fire any portions of the Linge dyke which, owing to the winding, the latter, cannot be seen from.

Fort Asperen, a semi-circular redoubt, with a bomb-proof barrack and a ditch, which, standing between the dykes of the Linge, can defend the end of the river; in this task it is assisted by a battery on the other (the south bank, which also covers the sluices which are there situated).

At a distance of 1,500 yards to the south of Asperen lies, or will lie *Fort on the Nieuwe Steeg*,² with a bastioned trace and with bomb-proof accommodation; this is intended to protect the southern Linge dyke, in same manner as the battery on the Dief dyke covers the northern.

The next line of advance for an invader is offered by the Waal and Merwede; this is covered on the north bank by Gorinchem, or Gorcum battery at Dalem, and a fort at Vuren.

Gorcum is a fortress of considerable size, of which the defences consist of nine bastioned fronts towards the land, and some irregular lines on the river while the fronts facing east have some small outworks; but the lesson taught by the war of 1870 causes reasonable doubt as to its possessing any considerable power of resistance against an attack by modern artillery, if because its ramparts enclose a large town. It contains some bomb-proof accommodation, and this is to be both augmented and improved. In addition to its task of guarding the Merwede, it is also intended, in case of the loss or abandonment of the land of Altena, to form a *point d'appui* for the right flank of the water-line.

The battery at Dalem is about 1,000 yards in advance of Gorcum, and 2 yards yet further to the east stands

The fort at Vuren, an earthen redoubt, with a wet ditch, and a trace which serves as a bomb-proof. This fort has been of late years much improved and enlarged, and occupies a strong position on the northern dyke of the Waal. These two defences serve to cover the river, the dykes, and some inundated sluices which lie near them.

¹ Or Kuilenburg.

² New Lane. These defences are to be completed during 1882.

3. The Section between the Waal and the Maas.

This section extends across the Bommeler-Waard, or island of Bommel and is intended to serve as an advanced position in front of the right flank of the water-line.

Inundations.—The level at which this district would be flooded is $A + 20''$ and even then much of the country would remain dry: this would be more especially the case on the north and south edges, where the ground is higher and is either arable, garden, or woodland, whereas in the centre, being pasture and polder land, it is lower. Since the average level of the Maas is only $2''$ above the inundation level, it is evident that the water required to flood this section must be taken as a rule from the Waal, which at Vuren is $16''$ above that level; but again the canals and ditches all communicate with and drain into the Maas, so that it can never be easy to arrange an inundation from the higher river.

Fortifications.—This section is defended by *Fort Loevenstein*, an old fashioned quadrangular fortification, of which three of the fronts have bastioned trace, while the river face is broken up into two small fronts; it has a wet ditch, beyond which is a counter-guard covered again by its own ditch, and flanked from small re-entering places of arms; it has no bomb-proof cover, except such as may be afforded by an old citadel.

It is intended to serve as an advanced work to Gorcum and Worcum, and to prevent the attack of Vuren from the south bank of the Waal, which is here about 600 yards in breadth. It is itself covered by two batteries, each provided with bomb-proof accommodation, which stand on the edge of the inundation, at a distance from Loevenstein of 3,000 and 4,000 yards respectively.

4. The Section to the South of the Merwede.

Inundations.—These are divided into two basins, separated from each other by the road from Geertruidenberg to Worcum.¹ They have each an inundation level of $A + 27''$, and differ from each other only in the source from which the necessary water is obtained.

That for the first or eastern basin is drawn from the Maas, through a sluice near Worcum, and since the river level at that place is from $A + 57''$ to $A + 58''$, the supply is at all times sufficient.

The second basin is inundated by opening, during the flood-tide, a sluice at the Bakkerskil, an arm of the Merwede, in which the tide rises to $A + 55''$ and thus yields an ample supply of water. Precautions, too numerous to mention here, must be taken with regard to the piercing of intervening dykes, and to the closing of retaining sluices; it is further to be noticed that the high road forming the boundary between the basins must be in some parts raised, or, being overflowed by the inundations, it will not be available for the use of troops retiring from Geertruidenberg or Worcum.

Fortifications.—Of these the largest is *Wondrichem* or *Worcum*, a fortified town on the Merwede, at the point where that river is joined by the Maas; this fortress is quadrangular, with one side parallel to the river; the three land fronts are traced on the bastioned system, and have wide wet ditches while the river front has no ditch, and is little more than a straight parapet. In advance of the southern and eastern fronts are two ravelins, through which roads enter the town. There is no bomb-proof accommodation for troops and the defensive power of the fortress, for the same reasons as the mentioned with regard to Gorcum, would probably not be very great. It is intended to guard the Merwede, the Waal, and the Maas, and also assist by its fire in the defence of the approaches to Gorcum.

¹ Opinions, however, differ as to what should form the boundary between the basins.

Fort Giessen lies outside the inundations, and is distant about 2,700 from the most southerly battery in the Bommeler Waard, from which, ever, it can receive, and to which it can render but little assistance, to the fact that the high dykes of the Maas intervene between them. to be completed during the present year, and has the trace of a redoubt two faces, two flanks, and a parapet which closes the gorge; the ditch wet, and there appears to be in it at present no bomb-proof cover. It is as an advanced work to Worcum, and protects the southern dyke of Maas.

About 7,000 yards further to the west stands *the fort on the Uppel* which is of considerable size, and has a modified bastioned front on southern face, with two short flanks and a gorge parapet. The ditch is and there is a small bomb-proof *rédut* in the centre of the gorge. intended to cover the high road on which it stands, and also the dyke which it takes its name.

The fort on the Bakkerskil lies about 1,800 yards to the south-west of mentioned above, and serves to guard the channel and the dyke along well as the inundation sluice which is situated about 200 yards further to the southward; it has a long face and two short flanks, while the is partially closed by a defensible barrack.

The fort on the Steurgat, also a branch of the Merwede, was commenced in 1880, and is to be finished this year. It is a pentagonal redoubt with wet ditch, and, standing about 3,000 yards from Bakkerskil, is intended to defend the New Merwede and its dyke, and thus to guard the right of the water-line against a turning movement from the west.

It has been already mentioned that it is probable that an invader endeavour to neutralize the inundations, either by drawing off the water thus making them fordable, or by letting fresh water in until they become navigable. The former process, as regards the new water-line, is scarcely feasible, since all the inundations rest on dykes which lie behind the forts; even where such a plan is possible, as for example:

- (a) No. 1 basin of the 1st section may be tapped by piercing the dyke between Muiden and Naarden;
- (b) Many basins can be drained into contiguous basins of lower level;
- (c) If the Waal be low, the inundations may be drawn off into cutting the dykes;
- (d) With regard to No. 2 basin of No. 4 section, as it is filled by opening a sluice at flood-tide, so it may be drained by opening it on the ebb;

it is still possible to supply fresh water; should the enemy attempt to carry out the second expedient, the surplus water can always be allowed to escape through the numerous sluices in the retaining dykes.

Telegraphic communication will be shortly possible between all the forts on the water-line, and throughout the whole length there are good paved gravel roads available for the movement of troops; but means of passage across the large rivers are much needed; for example, there is but one bridge (of boats at Vianen) across the Lek in rear of the line, and though proposed, in case of war, to throw a boat-bridge over the Waal, yet at present that river can be crossed only by ferries. There is a bridge on the Linde in rear of Fort Asperen.

The only line of railway in rear of the water-line is that from Utrecht to Amsterdam, so that if troops are to be moved from the former city to Naarden, they must be first carried to the capital. It is suggested that a line should be made from Utrecht to Gorcum to aid in the defence of the southern sections, while a cross-line from Abcoude to Weesp would do away with the necessity of the *détour* mentioned above.

It is further stated in the work from which this paper is mainly drawn that some position in rear of the line is much needed for the purpose there assembling and organizing large bodies of troops either for offence or defence. The ground is so low and damp as to be quite unsuited for that purpose, and it was at one time proposed to buy land and raise it artificially to a sufficient height; but this costly project appears to have been abandoned.

If the invaders should succeed in dislodging the defenders from the water-line, the latter will fall back upon the position of Amsterdam; this retreat will be made under most favourable circumstances, for its direction is through a country almost entirely composed of polders, in which therefore only the dykes will be available for the advance of the enemy, who would thus be forced to move on a narrow front, so that the defenders would find many opportunities of delaying his march. This retarding action of the defence is yet again facilitated by the fact that the ground falls from the water-line towards the west, so that it may well be possible to draw off the water from an inundation, which has been crossed or turned by the enemy into some fresh basin in rear of the former. In this manner a succession of lines may be held, and the ground may be disputed foot by foot.

THE POSITION OF AMSTERDAM.

Amsterdam, the commercial, as the Hague is the political capital, has been selected as the site of the Dutch national citadel and last defence, and intended, not only to afford the opportunity of continuing the struggle for independence after the fall of the New and the South Water-lines, but also to be in a condition to resist an invasion which, coming from the sea, must strike directly at the heart of Holland without encountering any previous obstacles. If no other reasons existed for the selection of Amsterdam for this honour, such a choice is compelled by the fact that this city is the true centre of Dutch nationality, but it is also the best possible position for defence from both a military and a naval point of view.

As a naval station, it has dockyards and arsenals, and further possesses communications with the sea by way either of the Zuider Zee, or yet more conveniently by the North Sea Canal, which has a depth of nearly 23 feet and will thus allow of the passage of vessels of considerable size. As a military position it is probably one of the strongest sites in the world, since the ground around it is so low² that the polder system is here carried out to the greatest extent, and inundations can therefore be made everywhere with ease, more especially since the sea is always available as a source of water. The country also, even when not flooded, is so intersected with ditches and canals, that the movement of bodies of troops would be impossible except along the roads; while it can be at any time inundated by merely stopping the hundreds of pumps (wind and steam) which by incessant working contrive to keep the ground comparatively dry. Again, the character of the soil is such, being nearly all sand and peat, and the water stands at times so near to the surface, that the besieger would be obliged to bring from a distance such earth as he would need for the construction of his batteries, &c. So absolute is this necessity, that within the position stores of earth have been accumulated for the purpose of therewith constructing the defences.

The general principle which has guided the plan of the inundations around Amsterdam is to place the outer edge of the inundations at such

¹ "Militaire Aardrijkskunde en Statistiek van Nederland," door M. Planten, Kapitein der Infanterie.

² In most parts below the level of the sea.

distance from the capital as shall secure the latter from bombardment, and the inner edge shall lie at a sufficient distance from the city to allow space for camps, hospitals, &c., as also for the pasturage of cattle for the use of the garrison.

The actual details of the inundation around Amsterdam are as yet undecided, and the whole system of defence will undergo such great changes it is not possible as yet to say what will be the eventual result.

It has therefore been held advisable to divide this portion of the paper into three parts, viz. :—

- I. The defences of Amsterdam, as they exist at present, corresponding inundations.¹
- II. The defences and inundations proposed in 1873.¹
- III. The defences proposed in 1881.¹

I. Under the existing system the inundations can be best considered by dividing them into three sections, namely :—

1. The North Front.
2. The West Front.
3. The South Front.

And these will be taken in order with the defences of each.

1. *The North Front*

extends from the Zuider Zee to the northern dyke of the North Sea. It is divided in five basins, of which space will not permit the boundaries to be given.

The first basin extends from the Zuider Zee to the North Holland Canal. It has an inundation level of A-15", and is flooded by stopping the windmills and a steam pump, and by letting in water from the canals; is not sufficient, sea-water can be supplied from the Zuider Zee through the sluice near Monnikendam, or brackish water from the North Holland Canal. The water cannot be drawn off by the enemy, but he can raise it with the view of making the inundation navigable, by letting in water from the Zuider Zee, which water, however, the defenders can drain off in the North Holland Canal, or can expel by again working the mills and pumps.

The second basin is filled by stopping the five mills and a steam pump drain it, and with water from the North Sea Canal. This basin is cut off from the first because it can be drained with less difficulty than the first, though it lies lower, and may be made navigable by running the water from the first basin into it. But the defenders have always the power to drain it into the North Sea Canal.

The third basin has an inundation level of A-15". It is filled in the same manner as the second. It is difficult to drain, and the enemy would gain by drawing off the water, while it is almost impossible to make it navigable.

¹ These are distinguished on the map as follows :—

I. Forts , batteries, &c. ●

Inundations, parallel lines, thus

II. Forts , batteries, &c. ✕, connected by a dotted line.

Inundations, parallel lines, thus

III. Forts and batteries as in II, but connected by a chain dotted line.

The ground marked by both horizontal and vertical lines is included in the systems of inundation.

The fourth basin has an inundation level of A - 20". In order to fill it mills are first stopped, and if this is not sufficient, water is let in from canals. The inundation cannot be drawn off, as what lower ground there has but a small area, and it can with difficulty be increased in depth.

The fifth basin has the same inundation level as the fourth, and is inundated by stopping the mills, and by letting in water from the North Sea Canal.

Fortifications on the North Front.

The first approach lies along the sea-dyke of Monnikendam and practically no defences, since Post No. 11¹ is a battery of no great value while Post No. 12 is little more than a mound of earth, and the battery the Kinselmceer exists only on paper, having been washed away in 1870. There is, however, a store of earth at Durgerdam, and in 1870 it was proposed to build a fort on the Ijdoorn, as also another in the Kinsel polder which should defend the inner side of the sea dyke.

Passing westwards we come next to No. 3 Post, which is described "intended for a battery;" No. 2 Post, a work partly made in 1868; and No. 1 Post, which is little but a supply of earth.

There are, in fact, at the present moment no defences on the north front of Amsterdam, but forts were in 1870 proposed, in the positions shown in map, in the Achtersluis Polder, and on the railway bridge over the North Sea Canal, for the purpose of guarding the latter.

2. The West Front.

Inundations.—The ground in this direction is not so low or so intersected as the northern front, yet it would be at all times exceedingly difficult to pass.

The inundations are divided into five basins: the first basin is filled by shutting the outflow sluices, stopping the pumps, and letting in water from the North Sea Canal; the inundation level is A. A second line of inundation can be formed further to the rear from the same source.

The second basin has a level of A - 12". Little water can be gained by stopping the pumps, and what is needed must be drawn from the stream which connects the basin of the Old Rhine with the North Sea Canal, which must be reinforced by shutting all the sluices which allow of the flow of water westwards, or of its escape to the sea.²

The third basin lies behind the second, and has an inundation level of A - 17". It is flooded in a similar manner to that used for the second. When the latter has been emptied by the enemy, the third basin can be drained into it, but fresh water can always be let in by the defenders.

The fourth basin has the same level, and is filled from the same sources as the third. The fifth basin is inundated to a level of A - 39", and is filled in the same manner as the second, third, and fourth, from the basin of the Old Rhine; but in this case it is necessary, failing waterways, to pierce the dyke between the polders.

The grave question, which has much exercised the minds of the Dutch, as to whether the huge Haarlem polder shall be inundated, it is proposed to discuss on a later page.

Fortifications.

(a) *The position at Spaarndam* is intended to guard the approaches to the bridges which exist there, but the defences which compose it, namely Fort

¹ See Map I.

This is a mere outline of a most complicated question, but space will not admit of more detail.

Nos. 3, 4, and 5, are nothing more than mounds of earth, and of no value whatever.

(b) *The position on the Liede.*—Of the fortifications in this line, Post No. 1 a redoubt with flanks and an open gorge covering the old Haarlem road, was partially repaired in 1868; Post No. 1 consists of two small batteries made in 1868, and is intended to guard the canal, the road, and railway; while the fort on the Liede is a masonry tower¹ of about 25 feet height, encircled, but not shielded, by a low parapet; the last stands on island in the canal which surrounds the Haarlem polder, and is intended defend the latter with its dyke, and the railroad from Haarlem to Amsterdam.

(c) *The position at Halfweg* includes Post No. 6, which consists of earthworks beside the railway, and Post No. 7, a small open battery; neither of these has at present any defensive value, though the latter was partially repaired in 1868.

(d) *The position between Halfweg and Schiphol.*—Of these Post No. 11 is ruins; and the forts on the Nieuwe Meer and at Schiphol quadrangular earthen redoubts with brick *rédouits*, though in moderate repair, are of great strength.

3. The South Front.

Inundations.—The ground in this section consists of a chain of six polders, very marshy and low, and is intersected by many wide canals.

The section is divided into six basins; part of the first basin lies so that if the pumps be not kept continually at work it will at almost all times be under water, and it is thus evident that, when the inundation has been made, the pumps must still be always in readiness lest the water may become navigable; again, new pumps must be made for this purpose, since those in existence stand on the outer edge of the line, and may thus pass into power of the enemy. The inundation level is for the former part A—157" the rest A—51". If owing to dry weather the stopping of the pumps not sufficient to form an inundation, water can be drawn from the Amstel river.

The second basin has an inundation level of A—55"; water is obtained from the same sources as for the first.

The third basin is inundated at two levels, the water in one part stands at A—118", in the other at A—47". Water is obtained as before by stopping the pumps, and if necessary from the Amstel and Vecht.

The fourth basin has an inundation level of A—47", and is flooded in the same manner as those before mentioned. It is considered by some that it would be wiser to keep it dry, as it is the kitchen-garden of Amsterdam.

The fifth basin is inundated at a level of A—39"; the water is obtained by stopping the pumps, and also from the Vecht and the intersecting canals. It may be made navigable by letting in water from the former, but this can easily be drawn off through the latter.

The sixth basin extends to the Zuider Zee, and has an inundation level of A—39"; it is flooded by stopping the pumps and with water from the Muiden Canal. If an attempt be made to render it navigable by letting in water from the Zuider Zee, this can be run off by the rear of the line.

Fortifications.

(a) *The position of Amstelveen* consists of two posts, both ordinary earthen batteries with open gorges: they are numbered 13 and 14, and were partially repaired in 1868.

(b) *The position of Ouderkerk* was also improved in that year, and included

¹ It is proposed to remove the tower.

Post No. 12, a redoubt with two short flanks; Post No. 11, and Post No. 1 which each consist of two open batteries.

(c) *The position on the Utrecht road* comprises a fort in the Laander polder which is quadrangular and of four bastioned fronts, with a wet ditch, but has no bomb-proof cover; it serves to defend the railway and road. Post No. an earthen battery, stands in advance of it, at a distance of about 1,500 yard Post No. 8 on the Gein is in ruins.

(d) *The position on the Sneep* includes four batteries, namely: Post No. 1 which is entirely open; Posts 20 and 21,¹ which are merely mounds of earth and Post No. 19, which is little better; Post No. 22, a little nearer Amsterdam, is out of all repair.

(e) *The position of Diemerdam* consists of four posts, namely: Post No. an open battery, and Posts Nos. 3, 4 and 5, which are in absolute ruins.

It is evident from the above that the existing fortifications around Amsterdam have no defensive value whatever, while the inundations are not considered to be sufficiently advanced, as regards their position, to fulfil the object of the protection of the city from bombardment.

II. In 1873 the following lines were suggested.

Inundations, such as are marked in lines on the map, having on the inner edge a length of nearly 62 miles, and being at no point less than 4 miles from Amsterdam.²

Fortifications.—These are divided into two parts, of which one is North, and the other South, of the line formed by the IJ and the North Sea Canal.

1. The Northern Section, commencing at the Zuider Zee, we find—

- (a) Some works on the sea-dyke near Uitdam.
- (b) A post to the north, and another to the south of Monnikendam.
- (c) A fort north-east of Edam.
- (d) A fort on the eastern dyke of the Beemster polder.
- (e) A fort on the southern dyke of the same.
- (f) A fort near Knollendam.
- (g) A fort on the railway, between Uitgeest and Krommenie, with
- (h) A post behind the St. Aagten dyke, and in front of the Krommer dyke.
- (i) A post on the new dyke.
- (j) A fort between the Wijker meer (or lake) and the Wijker brook.
- (k) A fort at Velsen.
- (l) A fort at the mouth of the canal.³

Total—eight forts and six posts: all these to be new works.

2. The Southern section, beginning at the West:—

- (a) A fort in the Buitenhuiser polder.
- (b) A fort behind Spaarndam.
- (c) A post on the Penningsveer (No. 1 Post of the old line)
- (d) The fort on the Liède, with a post behind the Liebrug (Post No. of the old line).
- (e) A fort at Halfweg, with a lunette (Post No. 6 of the old line).
- (f) A work at Polanen.
- (g) A fort at the Nieuwerkerker hoek.
- (h) A work at Sloten.
- (i) The fort on the Nieuwe Meer.
- (j) Fort Schiphol.

¹ Not marked in the map.

² It is useless to give the details of these inundations, consisting as they would principally of the names of polders, of which the boundaries cannot be shown the map.

See page 750.

- (k) A fort on the Oosteinder dyke.
- (l) A fort at Amstelveen.
- (m) A fort on the western dyke of the Bovenkerker polder.
- (n) A fort on the eastern dyke of the same.
- (o) A battery at Nestersluis.
- (p) A post at Vredelust.
- (q) A work at Botshol.
- (r) A work at the outer end of the Groenlandsche Kade.
- (s) A work at the Bambrugsche Zuwe.
- (t) A work at the Demerik water-mills.
- (u) Fort Nieuwersluis and the battery at the railway station.

Of these (c), (d), part of (e), (i), (j) and (u) are old works. Total (including Nieuwersluis, since that forms part of the water-line), 11 forts : 11 small works. Grand total—19 forts and 17 posts and batteries.

Coast batteries were also proposed, to be built on the dykes of the with the object of forbidding its access to hostile vessels.

III. The line of fortifications proposed in the estimates for 1881 was follows :—

1. On the Northern front, commencing at the Zuider Zee—

- (a) A fort at Edam.
 - (b) A post on the railway from Zaandam to Hoorn.
 - (c) A fort on the east dyke of the Beemster polder.
 - (d) A fort on the west dyke of the same, and on the North Holland Canal.
 - (e) A fort at Spijkerboor.
 - (f) A fort on the Stierop.
 - (g) A fort near Uitgeest.
- Total—six forts and one post.

2. On the Western front—

- (a) A fort near the Wijker brook.
 - (b) A fort at Velsen.
 - (c) A fort at Spaarndam.
 - (d) A post on the Penningsveer (old line).
 - (e) A fort on the Liede (old line).
 - (f) A fort at Vijflhuizen.
 - (g) A fort at Hoofddorp.
 - (h) A fort at Alsmeer.
- Total—seven forts and one post.

3. On the Southern front—

- (a) A fort between Kudelstaart and Kalslagen.
- (b) A fort at Uithoorn.
- (c) A fort at Nestersluis.
- (d) A fort at Stokkelaar's brug.
- (e) A fort at Abcoude.
- (f) The existing works on the Gein to be repaired and improved.

Total—five forts. Grand total—eighteen forts.

In order to complete this account of the inundations, it is necessary to add a few words as to the Haarlem polder. This, which up to the year 1840 was a lake, was drained at great expense¹ by works which continued until 1848 and is now in a state of high cultivation. Like other polders it is surrounded by a dyke, along which runs a canal, into which the surplus water of the polder is pumped by steam-engines. It has an area of about 72 sq miles, and a population of about 10,000, so that there is naturally n

¹ 1,125,000*l*.

hesitation as to its inundation, even in time of war. Again there is so much difficulty as to the supply of water: unless the weather be peculiarly wretched enough cannot be gained by stopping the pumps; the next resource is to draw it from the Rhine basin, but this will not suffice unless it be itself flooded, which cannot be done except with brackish water; as a last resource sea water may be let in from the North Sea Canal, but this will imply the loss of partial or total, of several harvests, of which each is worth 250,000*l*.

If to this sum we add the cost of re-draining the lake, it is easy to realise the hesitation of the Dutch to destroy this wonderful work; yet if it be destroyed the enemy can advance in it, and should he succeed in piercing the northern dyke, can draw off the water from the very narrow inundation beyond it, and thus pierce the line.

It is probable that a dyke will be made across the polder on a line through Hoofddorp and Alsmeer, and that the northern portion only will be inundated, but this plan is liable to the objection that the enemy, by piercing this dyke, can draw off the water from the inundation and thus make it fordable.

With regard to the general plan of the fortifications it is intended that the existing defences shall be retained in rear of those now proposed, in order to form a second line, should such be needed. The new works are to be prepared against a *coup de main*, to have bomb-proof cover for guns, ammunition, and garrison, and are to be armed with heavy artillery.

It must further be remembered, with reference to the defence of Amsterdam, that much assistance will be given by gunboats and monitors on the canals, while the care of the Zuider Zee and of the entrance to the IJ is, under the new scheme, handed over altogether to the navy.

There is one great difficulty to be surmounted in the case of a siege of Amsterdam: the population is about 317,000, and we may assume that the garrison will be at least 50,000; yet for these there is no drinking-water in the city, for the Amstel and the canals are not only rendered brackish by tide, but are tainted with sewage. The city is at present supplied with fresh water from the dunes near Haarlem, but at the very commencement of a siege that source may be cut off.

A supply of water can be obtained from the Vecht, at least until the enemy has pierced the water-line, but as soon as he approaches Nieuwersluis water can be drawn from above that fort, while below it, the stream is frequently so brackish as to be undrinkable.

THE LINES IN ADVANCE OF THE WATER-LINE.

These are two in number, namely:

- (1.) The line of the Eem and the Grift, commonly called the Grebbe, with a small section across the Betuwe between the Neder-Rijn and the Waal;
- (2.) The line of the Gelder IJssel;

and are intended, as before mentioned, to be held as advanced lines, the object of delaying the enemy's march, and of thus giving time for concentration and organization of troops, as also for the formation of inundations.

1. The Grebbe Line.

This position extends from Spakenburg, on the Zuider Zee, along the line to Amersfoort, and thence by the Grift to de Grebbe on the Neder-Rhine, is further prolonged to the Waal by a line from Spes to Ochten. Its total length of about 26 miles, and is distant from the Gelder IJssel about 15 miles, from the water-line in the north 9 miles, in the centre and south about 15 miles.

The character of the country in the northern part of the line is favourable to the defence, being low, marshy, and much intersected with ditches, &c. but to the south of Amersfoort this character is entirely changed, for the ground there becomes sandy and commences to rise, and is further covered with woods; yet more to the south the country again becomes low and difficult, while on approaching the Neder-Rhine, the soil changes from sand to clay, and so continues as far as the Waal. The level of the ground falls from A + 23 feet at de Grebbe, to A - 8 inches on the Eem, and it is therefore necessary to form the inundations in ten separate basins.

Space will not admit, and the line is not of so great importance as to require a detailed statement of these inundations, and it may be sufficient to say that the largest basin, that in the north, is flooded from the Zuider Zee, while the others, the required water is obtained by damming up the small rivers and brooks, and from the Neder-Rhine by way of the Grift. The formation of the inundations must therefore be a very slow process, and it is more than probable that, except in extraordinarily wet weather, they would not be completed until too late, or would be inadequately formed, at least in front of the centre of the line.

On account of this scarcity of water, there is but little fear that the enemy will be able to make any of the basins navigable, while he will derive but small advantage from draining them, since the time required for that operation would probably be greater than the period during which it is intended to defend the line.

The section between the Rhine and the Waal is flooded by damming Linghe, which has, however, at this point only a small quantity of water; the importance of this disadvantage is much lessened by the normal character of the ground, which is so flat, open, and intersected, that even without inundation it is capable of easy defence.

Fortifications.—At Spakenburg, on the Zuider Zee, the approaches against the extreme left of the line are covered by a square redoubt within the dyke, by two embankments on the dyke, and by a battery to the west of the harbour.

Further to the south lies the Grebbe line itself, a low earthen parapet strengthened at various points by works, either in or in front of the line.

These are all earthworks of various sizes and traces, and cover the different approaches to the line from the east, and of them the principal are:

At Eembrug—a proposed post.

At Krachtwijk—a front with barbettes in the line.

On the Koelhorster Kade—a proposed work.

On the Glashut—a front similar to that at Krachtwijk.

At Asschat—an advanced work, with a demi-bastioned front and an enfilade gorge.

At Roefelaar—three small irregular works.

Fort Daatselaar—an isolated work of considerable size, with an irregular trace.

On the Lambalge bridge—a small lunette.

On the Engelaar—a front of about 300 yards in length.

The Fort on the Buursteeg—a large hornwork. In rear of this star battery and a lunette on the railway.

On the Roode Haan—a small flèche.

At de Grebbe—a hornwork, three bastioned fronts, and a battery, the length of the whole line being about 1,500 yards.

At Spes and Ochten—two small works with wet ditches, connected by a line of parapet which is provided with occasional emplacements for guns.

The line is, as a whole, exceedingly defective; the inundations, as

been mentioned, are uncertain, many of the approaches are not in any way defended, and the great majority of the existing fortifications are in such a ruined condition as to be of little or no value as defences. The Grebbe line itself, for instance, is at best merely a breastwork with a parapet scarce 6 feet in thickness, while the barbettes which exist at intervals along it have a terreplein of only about the same width; at its worst, it has almost disappeared, and at some points is not even of sufficient height or strength to serve as a boundary to the inundation. Its ditch is partly filled up, partly overgrown, and the ground in front of it is so well provided with cover, that in many places an attacking force could advance unseen to within 100 paces of the line.

Money has been frequently demanded from the States-General for the repair and improvement of this defence, but has been always refused by the Second Chamber. In 1873, a sum of 136,000*l.* was asked for for this purpose, and again in 1880, improvements were suggested, but in each case were met with the statement that the military importance of the line and its rôle in time of war did not justify so great an expenditure.

The communications in rear of the line are excellent, since there are a great number of roads and three railroads, to which a fourth is shortly to be added. The ground behind the line is high, and well suited for encampments.

2. *The Line of the Gelder IJssel.*

This river is defended by a series of bridge-heads at the principal points of passage, namely:—

- (a) At Arnhem.
- (b) At Doesburg.
- (c) At Zutphen.
- (d) At Zwolle.

These defences are intended to delay the passage of the river by offering so much resistance that the enemy shall not be able to cross until he has closed up a considerable force to the front.

The military value of such a line and of such a system has been much disputed, and in the estimates of the present year the Minister of War proposes to abandon the use of Doesburg as entailing an unnecessary expense.

(a) *At Arnhem.* *Fort Westervoort*,¹ a quadrangular earthwork of which the front face has a weak bastioned trace, stands on the western bank of the IJssel, and defends the railway bridge which crosses the river at that point. The railway runs through the centre of the fort, which has a wet ditch, and two bomb-proofs each of four casemates; the armament consists of 12 guns and 12 howitzers, and the garrison in war would be about 500 men. In 1880 the fort was improved by raising the front parapet, and batteries are now being made near it, behind the dykes of the Rhine and the IJssel.

(b) *At Doesburg.* At this town, which is about 9 miles from Westervoort, is a *tête de pont* on the right bank of the IJssel. The works consist of two lines, the high and the low line, which together enclose the town towards the east at a distance of about 600 yards; the left of the line is covered by a quadrangular work, *Fort Bretagne*; the right by a hornwork, *de Vrijheid*. All the works have wet ditches, but no revetments, covered way, or glacis.

(c) The fort at Zutphen, and (d) that at Zwolle, have not at present been commenced, nor does it appear probable that any such forts will be built, the Minister of War decided in 1879 that the necessity of making such works bore no proportion to their probable cost.

¹ See Map No. III. No. 23, plate of forts.

² The river is about 200 yards in width.

We may therefore conclude, since Westervoort is the only work on line which is to be garrisoned, that the defence of the IJssel will be left to the destruction of the bridges, and to the protection of probable lines of passage by the field army.

In connection with this line it may be well to mention the forts on Upper Waal,¹ which form a prolongation of it.

These are—

(1) Fort Pannerden,

(2) Fort Kraijenhoff, and the forts above and below Lent,

and are intended to guard the river.

(1) *Fort Pannerden*² stands on the dam between the Pannerden and the Waal, and serves to forbid the passage of boats up the river also to prevent any attempt to turn the water from the Waal into the canal or *vice versa*.

It is a brick fort and is furnished on the Waal front with five casemates, which are eventually to be fitted with iron shields; it has a bomb-proof cover for the garrison, and is sheltered by a glacis with a covered way. It is armed with 40 guns and mortars, including howitzers in caponiers, six 6" guns on the Waal front, and five on the Pannerden Canal, and three 9" mortars. Its garrison in time of war would consist of about 350 men.

(2) *Fort Kraijenhoff* and the forts above and below Lent, are intended to defend the river and the railway bridge. The Minister of War, however, in the estimates of the present year proposes to abandon them as defective.

Fort Kraijenhoff lies on the dyke of the Waal, and is an irregularly shaped work with a wet ditch; it has a bomb-proof *reduit*, and in front it is a glacis and an advanced ditch. The most remarkable point about the fort is that it faces to the west, the eastern face being merely a brick wall which closes the gorge.

The fort above Lent is of very little value, being merely a small circular building enclosed by a ditch, into which water can be admitted by a small glacis and covered way; it contains seven 4.5" guns and one mortar. It can receive no assistance from either of the other forts, but can be bombarded without difficulty at short ranges by the enemy.

The fort below Lent is an earthen redoubt with bomb-proofs, and is surrounded by a ditch which can be filled with water. It is the least of the three works, but apparently faces north away from the river. It can give little assistance to *Kraijenhoff*, and not one of the three forts can cover the railway bridge. There are two bomb-proof towers at the southern end of the latter, which are intended to ensure the defence of the bridge by the fire of infantry.

THE SOUTHERN WATER-LINE.

This may be conveniently divided into three parts, namely:—

1. The line of the Maas and Hertogenbosch.
2. The position of Heusden.
3. The position of Geertruidenberg.

Of these it is proposed to abandon the last and the greater part of the first, and to use the remainder as a guard for the Bonmeler Waard, as a refuge for any troops which may be driven in from the southward.

1. *The line of the Maas includes—*

- (a) Fort Nieuwe St. Andries,

¹ See Map No. III.
No. 19 plate of forts.

- (b) The fort on the Blaauwe Sluis, and
- (c) Fort Crèvecoeur.

The first¹ is a pentagonal redoubt with a masonry keep; it is surrounded by a wet ditch, beyond which on the west side are a few outworks. The fort stands behind the St. Andries Canal, which connects the Maas with the Waal and serves to guard the adjacent sluice, and to forbid an entrance into the Bommeler Waard.

(b) The fort on the Blaauwe Sluis, which is a bastioned work with a wet ditch, a masonry *réduit*, and a loop-holed gorge wall, is to be dismantled. It stands on the left dyke of the Maas, and serves to guard the dyke and the river.

Fort Crèvecoeur² is a very large bastioned fort, which is surrounded by a wet ditch, but has no bomb-proofs; it is intended to cover the retreat of troops retiring across the Maas by a bridge of boats to the north of the fort, and also to guard the sluices near it. Two batteries standing near Fort Crèvecoeur on the railway are, by the present plan of the Minister of War, to be abandoned.

With regard to the position of Hertogenbosch,³ it is intended to demolish the works which compose it, and it will therefore be sufficient to say that it consists of—

- (1) A work at Herven,
- (2) A fort at Ochten,
- (3) Some works at Hintham,
- (4) Fort Isabelle,
- (5) Fort St. Anthony,

of which the three first are entirely out of repair, while the latter, of which (4) is a pentagonal bastioned fort, and (5) a crownwork with an open gorge, are old-fashioned as to their trace, and defective as to their profile. The fortified position at Vucht, which is defended by eight lunettes, and which lies to the south-west of Hertogenbosch, is also to be abandoned, in accordance with the desire of the Minister of War to concentrate the defence on the North Water-line.

The inundations of this section are divided into seven basins, of which

- (a) Has an inundation level of $A+13.5'$, and is flooded by damming the Dommel and the Aa, two tributaries of the Dieze.
- (b) With a level of $A+10.5'$, from the latter river.
- (c) From the same source, with a level of $A+12'$.
- (d) Also from the same source, with a level of $A+12.3'$.
- (e) Is inundated from the Maas through the Roode and the Blauwe sluices; it has an inundation level of $A+13'$.
- (f) Is flooded in the same manner as (b); level $A+10.8'$.
- (g) Is inundated from (f) by cutting the dykes; it has a level $A+9.8'$.

As it is very doubtful whether, unless much time be given, these inundations can, under ordinary circumstances, be formed, it has been proposed to make a reservoir at Well, on the Maas, for the purpose of supplying the necessary water; but since this portion of the line, with the exception of the river forts, is to be abandoned, it is very unlikely that any expense will now be incurred for the above object.

2. The position of Heusden.

The inundations of this section have a level of from $A+4'$ to $A+5.5'$ and

¹ No. 3 plate of forts.

² No. 7 plate of forts.

³ Or "Bosch," as it is generally called.

are formed by damming the various canals which drain the land ; should the means, as is probable, prove insufficient, water must be let in from the Maas, which at Helein has an average summer-level of A+6' ; the reservoir mentioned above would, however, much assist and accelerate the operation.

Fortifications.

(a) *The work on the Hedikhuizen Sluice*, an earthen lunette with a wet ditch and a closed gorge, intended to guard the above sluice, through which the water from the Maas passes to form the inundations.

(b) *The work on the Maas dyke*, a fair sized irregular earthwork, with a wet ditch and provided with bomb-proof cover and magazines ; it is used to defend the dyke from which it takes its name.

(c) *The work at the Bernsche Hoeven* is about 1,100 yards to the south-west of (b), and serves to cover a patch of ground near it which lies above the inundation ; it is a four-sided star-fort, with a wet ditch and bomb-proof accommodation.

(d) *The fort on the Elshout road*, a quadrangular earthwork, which has a wet ditch and a bomb-proof ; it is intended to forbid the use of the road to an enemy.

(e) *The work behind the Elshout dyke*, which serves to defend that dyke and an adjacent sluice ; it is a small semi-circular redoubt, with a wet ditch and some bomb-proof cover.

(f) *The fort behind the Doevoren sluice*, a six-sided earthwork with a wet ditch and a bomb-proof magazine. It is about a mile behind (e), and defends the same dyke, as well as the sluice which gives it its name.

The battery on the Pruimdijk, used to cover the flank of (f) ; it is, however, entirely out of repair.

Heusden itself is an old fortress which might, perhaps, in case of necessity give some little aid to the defence of this section.

Between the position of Heusden and that of Geertruidenberg lies the line the Langstraat, but since there are at present no defences here, though the forts have been proposed by the Labbeget and at Waspik, it is not desirable to give any space to the description of the inundations of this section.

3. The position of Geertruidenberg

is to be abandoned according to the last plans of the Minister of War, it will therefore be sufficient to say that the inundations were to be formed from two sources, namely, the Donge, a small river, and the Amer, a branch of the Merwede, and that the defences consist, in addition to Geertruidenberg itself, of an irregular fortress of eight bastioned fronts, of a position at St. hoven, which is a similar front in entire disrepair, and of a lunette in an open gorge standing to the north-west of the town. To the west of this position, on ground which lies too high to allow of inundation, stand the lines, Van den Hout and Van den Munnikhof, each about 1,100 yards in length and traced *en crémaillère*, and the work at Terheiden, a four-sided bastioned fort with a wet ditch. All these works are in ruins, but it is possible that they may be repaired in connection with the proposed defence at Moerdijk, of which we must now speak.

Of the 600,000*l.* which the Minister of War proposes to save by abandoning so much of the Southern Water-line, a sum of 253,000*l.* is to be expended on the fortifications which are to defend the railway bridge across the Hollandsche Diep.

No distinct position appears to have been at present selected for these defences, but it may be interesting to examine the character of the various schemes suggested.

It was at first held that the bridge might be made useless by destroying

span, but objections were made to this proposition that, apart from the enormous expense entailed by the subsequent repair, such destruction, carried out at a too early date, would seriously hamper the communications and the retreat of any forces to the south of the Hollandsch Diep, while if delay too long, the near approach of the enemy might render it difficult or impossible to execute.

A fort was then suggested at the southern end of the bridge, in such position as might best defend it and also the northern shore from the fire of the enemy's guns. The bridge, it was said, could be at any time destroyed as soon as the passage was no longer needed.

In 1880, a fort was proposed on the northern bank, where it was considered capable of protecting, not only the bridge, but also the Dordsche Kil, which the enemy's vessels of light draught could pass to Dordrecht and the New Merwede, by which they could move on to the right flank of the North Water-line. This fort was to be placed at Willemsdorp.

But since this plan left the harbour at Moerdijk and that at the mouth of the Roode Vaart at the mercy of the invader, it was decided that a fort must be built on a sandbank in the Hollandsch Diep to the north-west of Moerdijk for their protection.

Others again proposed that, in place of one expensive fort, a series of small works and batteries should be placed as a bridge-head, and that this position should be covered by inundations. In this manner the bridge, which from its great height is much exposed to fire, might be preserved from damage, since the enemy's artillery would be kept out of range.

Such plans have at various times been suggested, but until the present year no vote of money has been demanded for this purpose. It remains to be seen which, if any, of these systems may be adopted, but the preference appears to be given to that employing a bridge-head. In any case the line before mentioned to the south of Moerdijk will probably be repaired and held as advanced posts, useful for the reception of troops retiring from the south or south-east.

THE COAST DEFENCES.

These consist of the following, namely :—

1. The Helder position.
2. The position of the Mouths of the Maas and the Haringvliet.
3. The position of the Hollandsch Diep, and the Volkerak.
4. The works on the West Scheldt.

To these may be added the works which are to be constructed to defend the western end of the North Sea Canal and the harbour of IJmuiden. For this latter purpose money was demanded in 1879, 1880, and 1881, and in the last of these years the following scheme was proposed. That 24 c.m. (9-inch) guns should be employed, and that these should be covered by shields of Gruson metal,¹ in addition to an armoured turret armed with two 15 c.m. (6-inch) guns, the latter being in each case constructed of steel. Further to protect these from an attack on the land side, a position was to be made for infantry and for some machine guns.

Since by the late proposals of the Minister of War, (4) the works on the West Scheldt are to be abandoned,² it may be well to discuss these in a few words before proceeding to describe the others.

*Ter Neuzen*³ lies at the mouth of the canal which runs between the Scheldt and Ghent. It is a small fortress, with wet ditches except on the northern

¹ A species of chilled cast-iron.

² And are therefore not shown on the large map.

³ Map No. V.

side, built on the bastioned system, and strengthened with three ravelins, has some bomb-proof accommodation for troops.

Ellewoutsdijk, which stands on the opposite shore of the Scheldt (he about 5,000 yards in width), is a hexagonal fort, with a wide wet ditch, and with bomb-proofs on the sea-front.

These are the only defences of any value, since of the others, Flushing been long abandoned as a fortress, while Breskens on the mainland, Fort Path, in South Beveland, are in ruins.

1. *The position of the Helder.*²

This is of the first importance in the scheme for the defence of Holland since not only does it contain a good harbour, docks, arsenals, &c., but by position commands the entrance to the Zuider Zee, and thus, so long as it retained in the hands of the Dutch, prevents the possibility of the entire investment of Amsterdam; but there is yet more to be said on the subject for, since the circle of defence of the capital is divided into two parts by the North Sea Canal (which cannot be turned), an attack on the northern front is possible only in the case of a landing from the sea in that direction, and the latter may further be said to be feasible on the condition only of the capture of the Helder: it is the more necessary to guard against this danger for the reason that the coast between IJmuiden and the Helder is of a character calculated to favour the landing of an enemy.

We find, therefore, that the Helder is fortified towards the land as well towards the sea, the forts being as follows:—

Sea Defences—

- (a) Fort Kijkduin.
- (b) Fort Erfprins, and the Kaaphoofd Battery.
- (c) The Oost (or east) Battery.
- (d) The Priuses Louise Battery.
- (e) The Wierhoofd battery.
- (f) A fort at Harssens (incomplete).

Land Defences—

- (g) Fort Dirks-Admiraal.
- (h) Forts Oost and Westoever.

Fort Kijkduin and Erfprins can also assist in the defence of the land side, which is further aided by the lines of parapet which connect Erfprins with Dirks-Admiraal and the latter with Westoever.

(a) *Fort Kijkduin* stands on a sand-dune at a height of about 70 feet above the sea, and thus to a great extent commands the ground around it: while however, cover is given by any of the other dunes, these last are to be removed and lowered.

The fort was built by the French in 1812, and consists of a casemate building, on which stands a strong parapet facing seawards: it is surrounded by a dry ditch, flanked by musketry fire, and enclosed by a glacis and covered way, except on the sea-face, where stands a second revetted battery on a lower level. Considerable improvements, which are to be completed in October, 1883, are being made, on the following principles:—

The existing fort is to form a *réduit* only; the parapet of the lower battery is to be indented so as better to command the channel, and is to be provided with traverses and blindages; while on the land side a revetted parapet is to be made covering the south, and part of the east faces of the *réduit*. The parapet is to be enclosed in a dry ditch, with revetted escarps and counterscarps, which will communicate with the ditch of the *réduit*, and will

¹ Map No. V.

Map No. II.

flanked by masonry caponiers; around the whole will lie a glacis with covered way, while the bomb-proof magazines, &c., in the interior are to be improved and increased in number, and under-ground communications are to be made between the *réduit* and the batteries.

This fort is intended to defend the channel which bears the name of Schulpengat, and this it does at short range; but ships passing through the Westgat are at least 2,700 yards from the battery.

(b) *Fort Erfrins and the Kaaphoofd Battery* are about 1,400 yards to the north of Kijkduin. The battery, which stands at the extreme end of the sea-dyke, is a horse-shoe shaped earthwork, and is provided with a bomb-proof magazine; as soon, however, as the proposed additions to Fort Erfrin are completed, the Kaaphoofd battery is to be demolished, and in its place is to be made an epaulement for field guns to be used for the defence of the sea-dyke.

The improvements to the sea-face of the fort, which are to be completed in November, 1882, are to be as follows:—

A new coast battery for four heavy guns is to be made at the western end of the existing battery, and at right angles to the latter: it is to be provided with bomb-proof cover, and is intended to take the place of Kaaphoofd; an caponier is to be made for the defence of the ditch of the existing battery. Fort Erfrins serves as the *réduit* of the entire position, but for this purpose its situation is rather too eccentric: it is a large bastioned fort, with a wide ditch, beyond which are two ravelins and a covered way.¹ It has considerable bomb-proof accommodation, which is to be improved, while the parapet is to be heightened and thickened, except on the sea-face, and to be strengthened with traverses, but the trace is to remain unchanged.

Fort Erfrins, in addition to its share in the sea defences, forms also the right pivot of the land-faces.

(c) *The East Battery*, which stands on the sea-dyke, has an indented front and two short flanks, which are intended to defend the dyke: it is an earthen battery, but one of its flanks rests on a masonry *réduit*, in which are bomb-proof barracks: it is about 2,400 yards to the east of Kaaphoofd.

(d) *The Princess Louise Battery* is, in its present condition, too small and weak to be of much value; it will probably be eventually made into a mortar battery.

(e) The same may be said of the *Wierhoofd Battery*, which, however, it is proposed to enlarge and strengthen; but no money has been as yet voted for this purpose.

(f) *The fort at Harssens* will, when finished (September, 1883), consist of two turrets of Gruson metal, which are each to be armed with two 12-inch guns; the turrets are to stand on a masonry foundation surrounded by a ditch, which is to be defended by a counterscarp gallery. This fort stands on and indeed is a part of, the northern pier of the harbour of Nieuwe Diep, which last it serves to defend.

It may be noted that the efficacy of these sea defences is much diminished by the fact that hostile vessels, owing to the width of the channel, need not anywhere pass within 1,300 yards of the coast.

The Land Defences.

(g) *Fort Dirks-Admiraal* consisted originally of a crownwork, with two ravelins, containing a bomb-proof keep cut off from the fort by a ditch of its own. This trace is, however, to be entirely changed, and when the work is completed (in August, 1882) the fort will consist of a strong and high parapet of five faces, of which the flanks will rest on the lines which run towards the east and west; it will contain a small bomb-proof barrack, a

¹ Except on the sea-face.

will be surrounded by a wet ditch, in front of which will lie a mason caponier which is intended to enfilade the ground in front of the position. It is about 1,600 yards from Erfrprins.

(h) *Fort Westoever*, which stands at a distance of 1,300 yards from *Dirk-Admiraal*, is divided from *Fort Oostoever* only by the North Holland Canal.

The improvements for each of these forts are to be completed by August 1882; the former has been entirely deprived of its covered way, while parapets have been heightened and strengthened, and the flanks have been carried back to the lines which connect it with *Dirks-Admiraal*; the bomb-proofs and magazine have also been much improved.

Fort Oostoever has also undergone considerable alterations, consisting principally in the construction of bomb-proof cover, of which it had originally none, and in the increased height and thickness of its parapets.

These forts are both irregular earthworks with wet ditches, and serve to defend the ground in front of the line, the canal, and the sea-dyke.

The lines from *Erfrprins*, by *Dirks-Admiraal*, to *Westoever*, consist of straight parapet, in front of which lies a wet ditch, while in rear there is a broad road and a canal. The parapet of these lines also has been strengthened, and the emplacements for field-guns have been made in them; in addition between *Westoever* and *Dirks-Admiraal* one battery, and between the latter and *Erfrprins* two batteries for siege guns have been provided, and furnished with bomb-proof cover; they are intended to guard the approach from the south, and will be completed by August, 1882.

The inundations of the position will be formed, as a maximum, to the extent shown on the map; the water will be drawn through the North Holland Canal from the sea: but it is very doubtful whether inundations can be formed at all, except perhaps immediately in front of the lines, and further, when in any case they would be of any use, since the soil is entirely of sand, and intersected by only a very small number of ditches.

The principal channels between the *Helder* and *Texel* are—

- (1) The *Schulpengat*, of which the least depth is about 20 feet;
- (2) The *Westgat*, with a minimum depth at low water of 17 feet. As it runs towards the east, it is called the *Breewijd*; and after joining the *Schulpengat*, receives the name of the *Helsdeur*, and eventually forms the *Marsdiep*, which is the road of *Texel*, and has a breadth of 4,000 yards, with a minimum depth of 109 feet.

The harbour of *Nieuwe Diep* is about 2,200 yards in length by 100 to 150 in width, is separated from the *Zuider Zee* by a stone pier, communicates with the docks and the North Holland Canal, and has a sufficient depth of water to receive ships of the largest size.

The road and the harbour are available for use at all times, unless a long and hard frost may close them with ice.

2. *The position of the Mouths of the Maas and the Haringvliet.*¹

The most northerly of the mouths of the *Maas* offers to the enemy's vessel a direct passage to *Rotterdam*, the second commercial city of the kingdom, and should the invader for any reason be unable or unwilling to make use of this advantage, he has still, if he possesses the command of the *Scheur* the *New Maas*, the power to land troops within but a short distance of *Hague*, and thus to advance through *South Holland* to the attack of *Amsterdam*.

The depth of this arm of the *Maas* is on an average, above *Rotterdam* 11 feet, below *Rotterdam* 12 feet, and in the *Scheur* 13 to 14 feet. It is crossed at *Rotterdam* by a railway bridge, with a total length of 670 yards.

¹ Map No. IV.

while 50 yards below this there is a permanent bridge for foot-passen and carriages. The Maas is at Dordrecht¹ also crossed by a railway bridge which has a total length of about 400 yards. The more southerly of mouths of the Maas forms the Hollandsch Diep (commencing at the point of junction of the New Merwede and the Dordsche Kil); below Willemstad river again divides into—

(a) The Northern arm, called the Haringvliet, and

(b) The Southern arm, or Volkerak.

The Hollandsch Diep in the fairway, which is about 400 yards in width, has a depth of nearly 23 feet. The Dordsche Kil is about 14 feet in depth.

The Haringvliet is closed by a shoal, called the Hinder, over which at low tide there is 11·8 feet of water: it has three channels, of which the Bokke with a minimum depth of 12 feet and a width of 1,000 yards, is the largest. The latter runs close to, and is defended by the fortress of Hellevoetsluis which serves also to guard the Voorne Canal connecting the Haringvliet with the Old Maas: this canal has a surface breadth of 120 feet, a bottom breadth of 36 feet, and an average depth of 18 feet.

Hellevoetsluis is a bastioned fortress with wet ditches, and revetted escarp and counterscarp. It is armed with 120 guns, of which those on the sea-face are of a calibre of 24 c.m. (9·44"); it has a large steam basin and docks, and is to be defended by 7 monitors and 20 small gunboats. Its garrison in time of war would be from 4,000 to 5,000 men.

On the eastern bank of the canal stands a redoubt, with a closed gorge, which is armed with four 24 c.m. guns.

Money was voted in 1879, 1880, and 1881 for the improvement of the fortress and position, and a new fort has been proposed about 4,400 yards to the east of Hellevoetsluis, at a point where, by the nature of the channel, enemy's vessels must pass within a range of 400 to 500 yards of the shore.

The northern mouth of the Maas is guarded by the bastioned fort *Brielle*, which has a wet ditch and some bomb-proof cover.

In addition are the following defences:—

(1) *The Harbour Battery*, an earthwork at the mouth of the harbour, which is connected with one of the ravelins of the fortress.

(2) *The Steenenbank Battery*, which is intended to defend the channel;

(3) *The Reindijk Battery*, constructed to defend the land side of the channel. No money has been expended on these two last fortifications, very little on *Brielle* and the harbour battery, but it is intended to construct an armoured fort on the northern shore of the mouth of the Nieuwe Maas in the same style, but of lighter armour and armament, as that mentioned above at Harssens.²

The inundation in front of the position is formed by flooding nine polders of which eight are to be supplied with water from the northern, and one from the more southerly mouth of the Maas: two dykes which give access across the inundation are to be defended by batteries.

3. *The position on the Hollandsch Diep and the Volkerak.*

This consists of Willemstad and the surrounding forts: the character of the Hollandsch Diep has already been briefly described, while the Volkerak which divides the position has a minimum fair-way of about 150 yards in width, with a depth of 13 feet.

Willemstad is an old-fashioned bastioned fortress of seven fronts, with a wet ditch and a covered way: one front has a ravelin, and three only revetted; three bomb-proof magazines exist, but no bomb-proof barracks, though money was voted in 1879, 1880, and 1881, for the purpose of building.

¹ Usually called Dort.

² See page 750.

the latter; but it is probable that the efforts of the Dutch will be principally directed to the improvement of the sea-face, and of the detached forts. These are as follows:—

(a) *The fort on the Bovenluis*,¹ an earthen redoubt with a wet ditch and a bomb-proof *réduit*: it has, together with an earthen battery on the dyke, the task of defending the Oostdijk and the sluice whence it derives its name.

(b) *Fort de Hel*, an earthwork surrounded by a wet ditch, and having a bomb-proof keep: it is about 1,400 yards from the southern front of the fortress, and serves to guard the approaches from the south.

(c) *Fort de Ruiter*,² which lies 2,200 yards further west, is a redoubt of the same description, but, since it is intended to make of this and the succeeding the principal points of the defence, it will very probably be much strengthened. It serves to cover the Volkerak and the dyke adjacent to it, and also to assist in the defence of the opposite shore, on which stands

(d) *Fort Prins Frederik*,³ an earthwork similar in character to the others, but possessing, as detached works, three earthen lunettes (which guard the dykes by which it may be approached) and the line of Ooltgensplaat, an earthwork with a wet ditch to the west of the fort.

The distance between forts Prins Frederik and de Ruiter is about 2,400, that between the former and the redoubts about 650 yards: the front of this line is covered by an inundation, for which the water will be drawn from the Volkerak.

The outer edge of the inundations around Willemstad lies from 4,400 to 5,500 yards from the fortress: the water which is required is drawn from the Hollandsch Diep and the Volkerak through a great number of sluices; the soil is entirely of clay, and the country is intersected in all directions by numerous ditches.

On the opposite shore of the Hollandsch Diep, and at a distance of 2,500 yards from Willemstad, stands *Fort Numansdorp*, an earthen redoubt with a wet ditch, provided with a masonry *réduit* and other buildings: it is intended to assist in the defence of the fair-way of the Hollandsch Diep.

Conclusion.

Although many details of interest have been omitted in this paper, especially with regard to the coast defences, it has yet grown to such an extreme length that but small space can be allowed for further remarks; but there is one point which must not altogether remain unnoticed.

In many Dutch works on the subject of the defence of their country a suggestion is made that the march of an invader who advances from the east might be impeded and his operations harassed by what is styled a system of Eccentric Defence: this consists in the occupation, by an independent force, of positions in the north of Holland—for example, at Zwolle, Leeuwarden, or Groningen.

It is believed by some that a force so posted on the flank of the lines of communication of a hostile army which would be engaged in attacking the New Water-line, would much hamper the action of the latter, and might even, by an assumption of the offensive at a critical moment, succeed in relieving the defenders or in compelling the assailants to retire. Should the invader move in strength against this eccentric position, the defenders would retire within a line of almost impenetrable inundations, having in any case attained their object of lightening the pressure on the water-line; and further

¹ No. 21 plate of forts.

² No. 18 plate of forts.

³ No. 16 plate of forts.

communication with Amsterdam being at all times possible by way of the Zuider Zee, the defenders might be reinforced or be withdrawn at will.

The great objection to the practicability of this promising plan lies in the very small size of the Dutch Army compared with the great length of their principal line of defence ; for, since the Schutterij cannot be of any very great value at the beginning of a war, the safety of the kingdom actually depends upon the power of an army of 60,000 men to guard a line 40 miles in length against the attack of a force of many times their strength.

We may perhaps therefore assume that it would not be altogether wise to adopt such a system at the commencement of a war ; at a later period it might be scarcely possible, for the enemy will by that time have taken measures to prevent any such a diversion, by occupying himself the principal strategical points in Friesland and Groningen. But—and this is the point on which it is desired to lay stress—if some European Power, having temporary or permanent command of the sea, should desire to aid the Dutch in their struggle for independence, is it not evident that such assistance may best be given by the adoption of this very plan of eccentric action ?

Allowing that a force of 100,000 men might be sent to the aid of Holland, of what use would such an army be if it were cooped up behind the defensive lines, from which the means of exit are few and narrow ; what chance could there be of thence assuming the offensive, and would not the addition of so many mouths tend rather to diminish than to increase the resources of Holland ? Again, we have all heard or read of the extreme friction which is invariably caused by the juxtaposition of allied armies under separate command, or even under one head ; but where would be the possibility of ill-feeling when, though the object of each is the same, the two forces move from different bases by converging lines ? Each force in turn, without at first, if in inferior strength, permitting itself to be drawn into decisive action, could exercise such a pressure on the enemy as would force him to let go his hold on the other, and having thus relieved its ally, could fall back on positions by nature so strong that its own safety would be secured until corresponding action by the other army had relaxed the strength of the attack. But in order to produce such an effect each fraction must be of such strength that the enemy cannot, by a simple division of his forces, succeed in restraining both : for this reason the Dutch alone can make no use of this scheme of eccentric defence, since to adopt it would in practice be to commit the error of weakening their true and prepared defensive line for the purpose of holding a position, of which the defence is not of vital importance, while, in consequence of such a division of their forces, the offensive would become impossible to either fraction.

Such objections fall to the ground in the case where assistance may be afforded to the Dutch by an ally who can base his army on the sea, and he, by adopting the plan which so many have suggested, may hope to obtain from it independence of action, with freedom from friction, and the power of compelling or of refusing battle, which will find their ultimate result in victory, and in the full restitution of independence to Holland and the Dutch.